

NEW YORK, NEW YORK
BUS LANES AND LIMITED-STOP SERVICE

Table of Contents

NEW YORK CITY, NEW YORK (USA)	1
SUMMARY	1
CITY CONTEXT	1
PLANNING AND IMPLEMENTATION BACKGROUND	1
BUS PRIORITY TREATMENTS	2
EXPRESSWAYS	2
NJ-495 ON APPROACH TO LINCOLN TUNNEL	3
LONG ISLAND EXPRESSWAY (I-495) ON APPROACH TO QUEENS-MIDTOWN TUNNEL	3
GOWANUS (BROOKLYN-QUEENS) EXPRESSWAY – (I-278) BROOKLYN.....	4
GOWANUS (BROOKLYN-QUEENS) I-278 EXPRESS BUS LANE.....	4
GOWANUS EXPRESSWAY (I-278) CONTRA-FLOW BUS AND TAXI LANES.....	4
GOWANUS EXPRESSWAY I-278 CONTRA-FLOW HOV LANES.....	5
GOWANUS EXPRESSWAY (I-278) DUAL CONTRA-FLOW HOV LANES.....	5
BLUE LANE EXTENSION.....	5
STATEN ISLAND EXPRESSWAY (I-278) BUS LANE	5
GOWANUS PERFORMANCE AND COSTS	5
CITY STREETS	5
MADISON AVENUE DUAL-WIDTH BUS LANE	6
49 TH /50 TH STREETS CROSS-TOWN TRANSIT CORRIDOR	6
BUS SERVICES	7
EXPRESS BUS ROUTES	7
LIMITED-STOP SERVICE.....	7
ASSESSMENT	8
BRT PROPOSALS	9
LESSONS LEARNED	9
APPLICABILITY ELSEWHERE	10
BIBLIOGRAPHY	11

NEW YORK CITY, NEW YORK (USA)

Bus Lanes and Limited-Stop Service

SUMMARY

New York City is served by a broad array of local, limited-stop, and express bus services. Operating over city streets and expressways, their movement is expedited by the most comprehensive system of bus priority treatments in North America. Although there are many individual bus rapid transit (BRT) components and bus passenger volumes are among the highest in the world, there is no integrated bus rapid transit system as such. Still, an overview of the existing facilities and services affords important insights for other cities.

CITY CONTEXT

The 9-square-mile [23-km] Manhattan Central Business District (CBD), south of 59th Street, is the main business center for the region's 16 million residents and among the largest business centers in the world. This area has a weekday employment of about 1,850,000. During the morning peak hour, about 640,000 people enter this area, more than 85% by public transport. Rail rapid transit and commuter railroads account for 78% of all AM peak hour entrants and buses about 7%. ⁽¹⁾ In the AM peak hour, a total of 1,300 buses enter the Manhattan CBD (excluding local New York City routes) – a number that exceeds most bus fleets in the United States. ⁽²⁾

PLANNING AND IMPLEMENTATION BACKGROUND

Bus priority treatments in New York City began in 1963 when the City's first bus lane was installed on Victory Boulevard, Staten Island, on the approach to the Staten Island Ferry Terminal in St. George. This was followed by a bus lane on Hillside Avenue, Queens, on the approach to the Queens Boulevard subway line. The main expansion of bus lanes and bus streets came in the late 1970s and early 1980s, as part of New York City Department of Transportation's (DOT's) program to redress the balance between automobiles and transit. ⁽³⁾

The exclusive bus lane on the New Jersey approaches to the Lincoln Tunnel (see [Figure 1](#)) also dates back to 1963, when the Port Authority prepared a report evaluating several schemes and recommended the basic plan that was implemented. Field tests to determine feasibility were conducted during 1964 and 1965. The first 4-day experiment (September 8, 1964) closed the "exclusive lane" to westbound traffic and determined that the two westbound lanes had sufficient capacity. The second, and most critical, phase (December 1965) included a 3-day test of actual roadway operations using maintenance trucks as "buses." The eastbound movement of trucks in the reversed lane did not adversely affect westbound traffic.

Based on the results of these field tests, a January 1967 report recommended the exclusive bus lane plan. In late 1970, the New Jersey Department of Transportation, based on a July 1970 report by its Bureau of Research and Evaluation, determined that the exclusive bus lane should be implemented as soon as possible.

The workability of the NJ-495 contra-flow lane in New Jersey led New York City to implement similar treatments on the Long Island Expressway in 1971 and on the Gowanus Expressway in 1980. Express bus service was implemented within the City in the 1970s to serve areas without direct subway access. By the mid-1980s, the system was well established. New York City Transit began operating limited-stop bus service in Manhattan some 25 years ago; by the late 1980s, this service had expanded dramatically.⁽¹⁾ [Table 1](#) provides a summary of exclusive bus lane treatment in New York City during the early 1980s.

BUS PRIORITY TREATMENTS

An extensive system of bus priority facilities has been progressively implemented in the New York Metropolitan Area over the last four decades. These facilities are designed to give buses an operating environment that is free from hindrance, especially at major river crossings with recurrent traffic congestion. Facilities reflect the concerted efforts of the New York City Department of Transportation, Port Authority of New York and New Jersey, Triboro Bridge and Tunnel Authority, and the New Jersey Department of Transportation. Collectively, more than 15,000 buses operate each day on over two dozen priority facilities within New York City, and many more operate to and from New Jersey.⁽³⁾

The bus priority treatments are found along both city streets and expressways. They include exclusive or priority use of curb lanes, median contra-flow lanes, and, in some cases, entire streets. They are provided on the gateways to Manhattan, on approaches to the Staten Island Ferry and the Queens Boulevard subway, and within the Manhattan Central Business District (CBD). [Figures 2](#) and [3](#) show locations of the principal facilities outside and within “Midtown” Manhattan, respectively. Facilities include the contra-flow bus lanes on NJ-495 approaching the Lincoln Tunnel I-495, the Long Island Expressway approaching the Queens-Midtown Tunnel, and the I-278 Gowanus (Brooklyn-Queens) Expressway from the Verazzano Bridge to the Brooklyn-Battery Tunnel. Other facilities are the 49th-50th bus-taxi street, the Madison Avenue dual bus lanes, and an extensive system of curb bus lanes on Manhattan avenues and major cross-town streets. (See [Table 2](#)).

EXPRESSWAYS

Salient characteristics of the NJ-495, Long Island Expressway, and Gowanus Expressway contra-flow bus lanes are summarized in [Table 3](#). The lanes operate “inbound” toward Manhattan during the morning peak period. They are heavily used, with peak-hour bus volumes ranging from about 100 to 700 buses per hour, and travel time savings ranging from 15 to 20 minutes. Installation costs ranged from \$70,000 on the Long Island Expressway to \$10 million on the Gowanus Expressway. A brief discussion of each facility follows.

NJ-495 ON APPROACH TO LINCOLN TUNNEL

This 2.5-mile [4-km] exclusive contra-flow bus lane on the approach to the Lincoln Tunnel was placed in service in December 1970. It connects with the Lincoln Tunnel, which has direct entry ramps into the 200-berth Midtown Bus Terminal. The facility operates from about 6:30AM to 10:00AM on weekdays. Each weekday, more than 800 buses, carrying over 35,000 people, enter Manhattan during the morning peak hour. A special ramp from the New Jersey Turnpike also enters the lane on the west. About 650 buses actually used the bus lane in 1998, although volumes of 700 to 800 buses per hour have been recorded.⁽⁴⁾

The lane was implemented by the Port Authority of New York and New Jersey as part of a federal Urban Corridor Demonstration Project in cooperation with the Tri-State Regional Planning Commission, New Jersey Department of Transportation, New Jersey Turnpike Authority, and the Federal Highway Administration. Initial construction costs were about \$700,000, and current operating costs approximate \$400,000 per year.

Buses (seating 16 or more people) operate eastbound in the 11-foot [3-meter] median lane of the three-lane, 32.5-foot- [10-meter-] wide westbound roadway. Traffic operations are controlled with manually placed traffic posts in pre-drilled pavement holes and with overhead lane control signals. Using electronic toll collection and exclusive lanes, buses have priority access through the Lincoln Tunnel Toll Plaza.

Buses travel with their headlights on at about 35 mph [56 kph]. Travel time savings of 10 to 25 minutes have been reported, with 18 minutes typical, a savings of over 7 minutes per mile!

The project is significant in several important aspects: (1) it increases the person-movement capacity; (2) it alleviates a bottleneck condition as part of an integrated system of facilities including the New Jersey Turnpike, NJ-495, Lincoln Tunnel, and Midtown Bus Terminal; and (3) it shows how two toll-facility authorities, a regional planning agency, a state Department of Transportation, the Federal Government, and local public agencies worked together to achieve quick implementation.

LONG ISLAND EXPRESSWAY (I-495) ON APPROACH TO QUEENS-MIDTOWN TUNNEL

This 2.2-mile [3.5-km] contra-flow bus and taxi lane was installed October 26, 1971. It extends from east of the Brooklyn-Queens Expressway to the Queens-Midtown Tunnel. It operates from 7:00AM to 10:00AM on weekdays and is used by about 300 buses and over 200 taxis. During the AM peak hour, some 125 buses bring over 5,000 people into Manhattan.

Costs to implement the lane approximated \$50,000 for signs, cones, and median changes, and about \$20,000 for traffic posts in drilled holes. Cited annual operating costs (1980) approximated \$150,000.

Like the NJ-495 lane in New Jersey, buses operate non-stop in the lane. Distribution in Midtown Manhattan is via on-street bus lanes. Buses save about 15 minutes during the peak period, about 7.5 minutes per mile.

GOWANUS (BROOKLYN-QUEENS) EXPRESSWAY – (I-278) BROOKLYN

This expressway serves the express buses operating from Staten Island and sections of Brooklyn to Manhattan. To expedite bus and car pool flow, AM peak-period priority treatments were introduced and progressively expanded over the past 25-years. The priority lanes encompass more than 5 miles of expressway.

A 1.2-mile [2-km] median bus-only lane was installed on the approach to the merge with the Shore Parkway in October 1976. A 0.9-mile [1.5-km] contra-flow bus and taxi lane was installed between the Prospect Expressway and the Brooklyn Battery Tunnel in October 1980. In 1996, this lane was extended 2 miles [3-km] southerly to the Shore Parkway and opened to car pools. In 2000, dual high-occupancy vehicle (HOV) lanes were installed north of the Prospect Expressway Interchange, and a contra-flow HOV lane was installed in the south tube of the Brooklyn-Battery tunnel. The original median bus lane was converted to HOV use and extended southerly to the Verrazano Bridge in September 2000. In addition, a 1-mile [1.5-km] eastbound bus-only lane was installed on the Staten Island Expressway approach to the Verrazano Bridge during 2000.

GOWANUS (BROOKLYN-QUEENS) I-278 EXPRESS BUS LANE

An exclusive median bus lane was established on the Southern Gowanus Expressway on October 25, 1976. Known as the “Blue Lane,” because of the blue line running the length of the lane, this facility operates weekdays from 6AM to 10AM. The lane runs north from the 65th Street exit ramp to the merge with Shore Parkway, a distance of 1.2 miles [2 km]. Fifteen bus lines bound for Midtown and Lower Manhattan from Brooklyn and Staten Island are served. The 360 buses carrying over 13,000 passengers and 150 taxis carrying over 200 passengers save up to 15 minutes daily, according to New York City DOT.

GOWANUS EXPRESSWAY (I-278) CONTRA-FLOW BUS AND TAXI LANES

On October 27, 1980, a contra-flow lane was established weekday mornings from 7:00AM to 9:30AM on the Gowanus Expressway to allow buses to bypass congestion at the approach to the Brooklyn-Battery Tunnel. Express buses from Brooklyn and Staten Island, as well as taxis with passengers, were allowed to travel north 0.9 miles [1.5 km] along the southbound highway between the Prospect Expressway Interchange and the tunnel toll plaza. Nineteen bus routes are served. The 260 buses carrying 11,500 passengers and 200 taxis carrying 260 passengers save up to 20 minutes daily.

GOWANUS EXPRESSWAY I-278 CONTRA-FLOW HOV LANES

Ongoing maintenance and reconstruction of the Gowanus Expressway resulted in extending the contra-flow bus-taxi lanes southerly to the Shore Parkway and opening the lane to car pools in 1996. Increased queuing by car pools at the Plaza reduced the time saved by buses although electronic toll collection has since eased this somewhat. The southbound access to the Prospect Expressway is closed during the period that the contra-flow lanes operate.

GOWANUS EXPRESSWAY (I-278) DUAL CONTRA-FLOW HOV LANES

Dual contra-flow HOV lanes were installed north of the Prospect Expressway during 2000 (one each from the Prospect and Gowanus Expressways), and a contra-flow HOV lane was provided in the South tube of the Brooklyn-Battery Tunnel.

BLUE LANE EXTENSION

The original “Blue Lane” was extended about a mile southerly to the Verrazano Bridge in September 2000. At this time, the lane was open to use by car pools.

STATEN ISLAND EXPRESSWAY (I-278) BUS LANE

A westbound bus-only shoulder lane was installed on the approach to the Verrazano Bridge in 2000. This bus lane, like the initial installations on the Gowanus Expressway, serves as a queue bypass of congestion at choke points.

GOWANUS PERFORMANCE AND COSTS

The current system of priority lanes has been implemented by New York State DOT since 1996 at a cost of slightly over \$10 million. The 5-mile HOV lane on I-278 from the Verrazano Bridge carries 11,000 people in the morning peak hour. The HOV lane operates contra-flow most of the way north of the Shore Parkway and as a concurrent-flow median lane to the south. The contra-flow lane is provided by using moveable barrier technology. The 2+ HOV lane, which operates between 6:00 and 10:00 AM, has saved users 20 minutes between the Verrazano Bridge and the Shore Parkway.

Daily express bus ridership in the corridor increased from 17,000 per day in 1955 (before the priority lanes were extended) to over 38,600 in 2000. Contributing factors include Metrocards, fee transfers, and the use of comfortable (57-seat) coaches, introduced in 1999.

CITY STREETS

These facilities serve local, limited, and express routes. They generally operate during the AM and/or PM peak hours, but a few (e.g., bus streets) operate throughout the day. Peak-hour bus volumes generally range upward from 50 buses to over 100. Travel time savings are modest

because bus lanes are frequently blocked by standing or parked vehicles. Discussions of the Madison Avenue dual-width bus and the 49th-50th taxi street follow.⁽⁵⁾

MADISON AVENUE DUAL-WIDTH BUS LANE

The highest bus volumes in Midtown Manhattan, about 200 buses during the peak hour, are found on Fifth and Madison Avenues. Five local and 30 express routes along Madison Avenue entail such high volumes and so many stops that a single bus lane cannot handle them alone. To accommodate this demand, the first exclusive concurrent dual bus lanes on a city street were established on Madison Avenue on May 26, 1981.

The lanes run from 42nd Street to 59th Street during the weekday hours of 2:00–7:00 PM. The two right-hand lanes are reserved for buses only, whereas the remaining three lanes are available for mixed traffic. An extra moving lane was gained by prohibiting all parking from the left curb, including truck loading and unloading, from 1:00–7:00 PM. Right turns from Madison Avenue are prohibited except for taxis with passengers, which are permitted to travel in the lane as far as 46th Street, where they must turn. The bus lane is defined by signs, pavement markings, and traffic control agents at intersections. Capital costs and the first year's operating costs were funded by a federal demonstration grant.

The lane has substantially improved Midtown transit service. During the peak hour, local bus travel speeds have jumped from 2.9 mph to 4.8 mph (+65%) and express bus speeds increased from 2.9 mph to 5.8 mph (100%). Bus reliability also increased dramatically. Previously, trip times for local buses varied from 14 to 28 minutes; trip times with the bus lane range from 9 to 14 minutes. Express bus time variation went from between 12 and 31 minutes before the bus lane to 6 to 14 minutes after its installation.

These improvements were made without adverse effects on automobile traffic on Madison Avenue. Survey results show that removing the friction between buses and other vehicles improved the speeds of the remaining traffic on Madison Avenue by 10% during the rush hour period even though volumes on Madison Avenue increased by 10% as well.

Bus stops are located approximately every three blocks (about 660 feet) – with local and express routes stopping in separate locations. Bus dwell times, however, are increased by the narrow doors, high steps, and complex fare structures on the express bus routes, many of which use over-the-road vehicles.

49TH/50TH STREETS CROSS-TOWN TRANSIT CORRIDOR

The cross-town bus service on 49th and 50th Streets serves approximately 27,000 passengers traveling across the heart of Midtown daily. Before improvements, this route had one of the slowest speeds of any cross-town street in Midtown, approximately 3 mph (walking speed). Therefore, the 49th and 50th transit-taxi streets were introduced on June 12, 1979, to give preferential treatment to transit users. Automobiles with no destination on 49th and 50th Streets

are prohibited on weekdays between 3rd and 7th Avenues from 11AM to 4PM. Buses, taxis, and commercial vehicles making local deliveries are allowed. The ban is announced by signs and (initially) enforced by traffic control agents at the major intersections. Access to parking garages has been maintained; patrons of garages with entrances only on 49th and 50th Streets are allowed to travel for one block.

A 35% decrease in bus travel times (from 18 to 11 minutes) has been recorded, saving 7 minutes for 7,500 passengers daily. Over 2,000 taxi passengers have also benefited, with travel times reduced from 13.5 to 9.5 minutes, a 30% improvement. The impact on adjacent streets has been minimal. The treatment has been extended to 6 PM to cover the evening peak hours. Over time, both taxi use and the number of violations have increased, reducing benefits to bus travelers accordingly.

BUS SERVICES

The express, limited-stop, and local bus services converging on Manhattan and also operating in other boroughs are provided by both public and private operators. New York City Transit (NYCT) operates most local bus routes, as well as an extensive limited-stop service along major routes. NYCT and franchised private express operators provide express service to the four outlying boroughs. New Jersey express and local bus services mainly operate through the Lincoln Tunnel to the Port Authority's Midtown Bus Terminal; they are certified by the Interstate Commerce Commission. Some New Jersey buses operate through the Holland Tunnel and serve Manhattan via City streets. New York State certified buses run to and from Long Island and Westchester.

EXPRESS BUS ROUTES

New York City's express bus routes serve areas in the outer boroughs that do not have subway service. Fan-like route patterns converge on the Harlem and East River Crossings – mainly on the Brooklyn-Battery Tunnel and the Queens-Midtown Tunnel. In addition, a large number of New Jersey bus routes (both local and express) converge on the Lincoln Tunnel; most operate via NJ-495.

The express routes generally operate during peak periods, run non-stop over express highways, and charge premium fares. Over-the-road carriers serve many of these routes.

LIMITED-STOP SERVICE

New York City Transit operates limited-stop service in all five boroughs. Some 25 of the 200 local bus routes in New York City have a limited-stop component; 14 of these operate only in the peak hours. ⁽⁶⁾

The limited-stop service is a variant of local bus service. Buses make stops at about every eight to ten blocks (0.5-mile intervals), usually at major intersections, institutions, or places of high-passenger activity. The various limited-stop routes either serve (1) a transportation hub or other

high-traffic generator or (2) operate as part of a grid route. Figures 4, 5, 6, 7, and 8 show the City's limited-stop routes in the various boroughs. Limited-stop service generally reflects the following factors:

- It should operate on wider roads, ideally at traffic level of service "C" or better.
- It should operate on roadways with progressive traffic signal timing.
- The spacing between stops should approximate 0.5 miles.
- It should not operate closely parallel to rail rapid transit or commuter lines.
- The route should be at least 5 miles in length.

Generally, reasonable headways should be maintained for the local service along the same route. This normally involves a maximum 10-minute headway for both limited and locals.

The limited-stop buses use the same conventional and articulated buses as local service. Only front and side route-destination signs identify them. Entry is limited to a single front door to maintain revenue security. However, various visual features have been located at bus stops to make the service more recognizable and easier to use.⁽¹⁾ These features include the following:

- Destination signs that indicate a bus operates as a limited-stop service,
- Window cards in fluorescent colors (orange and purple) saying "Limited" placed on the dashboard,
- Bus stops with special orange and purple "limited-stop" decals (old look signs),
- Bus stops that use a different color information panel for local and limited-stop services (new look signs),
- Separate limited-stop operating schedules where schedules are shown at bus stops,
- Bus maps that show schedule information separately for limited-stop and local service (including span and frequency), and
- Identification of limited-stop trips on passenger timetables.

Analysis of the limited-stop service indicates the route length, route speed, and travel time characteristics summarized in Table 4. Overall, routes averaged about 8.3 miles, and limited-stop buses saved almost 1 minute per mile. Limited-stop buses saved 0.5 minutes per mile in Staten Island, 0.9 minutes per mile in Queens, 1.2 minutes per mile in the Bronx and almost 2.0 minutes per mile in Manhattan. These time savings approach those that might be attained by bus rapid transit service, in which there is faster boarding and alighting and traffic priorities are provided along the bus route.

ASSESSMENT

New York City's extensive express and limited-stop bus services carry large numbers of passengers. Aided by contra-flow bus lanes, express buses provide substantial time savings on

the gateways to Manhattan. The many limited-stop services within the City save riders about 1 minute per mile. Neither, however, provides “bus rapid transit”. The express buses charge premium fares, usually operate only during peak periods, and use over-the-road vehicles that result in long passenger service times at stops. The limited-stop services, while providing improved timetables, stop information, and route-destination signs, still lack the integrated identity, marketing, and traffic priority treatments associated with BRT systems. They require front door passenger entry, often through a single channel, thereby increasing dwell times.

BRT PROPOSALS

Over the years, various proposals have emerged for developing bus rapid transit service in the New York Metropolitan Area. Examples include the JFK Transitway, Staten Island Rapid Transit Guided Busway, and the Hudson-Bergen Transit Corridor. None, however, have been implemented, either because of perceived site-specific problems or prevailing negative attitudes toward bus services. Moreover, modern low-emission bus propulsion technologies (such as dual-mode or hybrid diesel electric vehicles) were unavailable. And it was rail technology, “light-rail” in particular, that became the public image of rapid transit over the past two decades.

There are several reasons why BRT has not been implemented in New York City and its environs, despite the strong ridership potentials. Most of the bus service innovations and bus priority treatments were implemented *long before* the concept of bus rapid transit became fashionable. Moreover, they were initially installed as AM peak-period “queue” bypasses, rather than as integrated BRT systems, to alleviate congestion in corridors not well served by rail transit. More importantly, they were installed in an environment with an extensive network of rail rapid transit and commuter rail lines. Rapid transit in New York means “rail,” and the major emphasis has been placed on maintaining and improving the rail service.

BRT development has also been inhibited by the many competing demands for limited street and curb space, both in Manhattan and outlying boroughs. Providing protected rights-of-way for buses has been difficult. Many arterial streets where limited-stop buses run are lined with stores that require curbside access. Even where curb bus lanes are provided, enforcement is often a problem.

The large number of public and private bus services, each with different operating policies, vehicle types, and fare structures, also inhibits BRT.

Nevertheless, NYC Transit and NJ Transit both have long, busy routes that may benefit from more “BRT” elements. Examples include the Flatbush Avenue and Fordham Road limited-stop services in Brooklyn and the Bronx, respectively. Bus rapid transit is an integral part of a proposal to develop continuous service roads along the Cross Bronx Expressway.

LESSONS LEARNED

Several lessons emerge from the New York experience:

1. Cities can provide extensive systems of priority measures to expedite bus flow, even in densely developed downtown areas.
2. Express and limited-stop bus services, while desirable in providing bus priority treatments, do not in themselves necessarily result in BRT.
3. Limited-stop services along city streets *can* form the first stage of BRT where ridership density is sufficient. Next steps may include better fare structures and passenger amenities, bus preference at traffic signals, and, in some cases, bus-only lanes.
4. A multiplicity of bus operators can serve as a deterrent to implementing BRT.
5. Also, in areas with extensive rail transit, the necessary community support may be limited.

APPLICABILITY ELSEWHERE

Although New York City is unique in terms of geography, development density, ridership demands, and scale of operation, several of the bus priority treatments and service innovations have potential transferability to other communities. These include (1) the extensive use of expressway contra-flow lanes where traffic volumes are imbalanced by direction, (2) dual bus lanes for heavy bus volumes on downtown streets, and (3) use of limited-stop bus service as a precursor to BRT.

BIBLIOGRAPHY

1. Final Report – A Comprehensive Express Bus Service Plan for New York City, Polytechnic University, New York, July 1990.
2. Levinson, H.S., Hoey, W.F., Sanders, D.B., and Wynn, F.H., NCHRP 143: Bus Use of Highways: State of the Art, Transportation Research Board, National Research Council, Washington D.C., 1973.
3. Fausch, C.J. and Tremble, K.B., “Evaluation of HOV Facilities in the New York Metropolitan Region,” Compendium of Technical Papers, London, England, Institute of Transportation Engineers, 1985.
4. New York Metropolitan Transportation Council, Hub-bound Travel Report, 1997.
5. New York City Department of Transportation A Report on Policies and Programs, July 1983.
6. Priority Techniques for High Occupancy Vehicles – State-of-the-Art Overview, Technology Sharing U.S. DOT, November 1975.
7. Pratt, R.H. et al., TCRP Web Document 12: Traveler Response to Transportation System Changes: Interim Handbook, Transportation Research Board, National Research Council, Washington, D.C., March 2000.
8. New York Metropolitan Transportation Council, 1977 Hub-bound Travel Report.
9. The Urban Transportation Monitor, Vol. 15, No. 3, February 16, 2001.
10. Goodman, L. and Selinger, C. “The Exclusive Bus Lane on the NJ Approach to the Lincoln Tunnel,” In Highway Research Record 415, Highway Research Board, National Research Council, Washington D.C., 1972, pp. 38–48.

Table 1: Summary, Exclusive Bus Lane Treatments in New York City

No.	Roadway & Limits	Starting Date	Length (miles)	Hours of Operation (Mon – Fri)	No. Of buses	No. Of Riders	Est. Time Savings (Min)
EXCLUSIVE LANES							
Contra-flow							
1	Second Avenue 57 th St. to Queensboro Drive	10/30/78	0.09	4pm – 7pm	240	9,700	10*
2	Gowanus Expressway, Prospect Expressway to Brooklyn-Battery Tunnel	10/27/80	0.90	7am – 9:30am	260	11,500	To 20
3	Long Island Expressway, Brooklyn-Queens Expressway to Queens Midtown Tunnel	10/26/71	2.00	7am – 9:30am	310	14,000	To 20
Concurrent							
4	Madison Avenue 42nd Street to 59th Street	5/26/81	0.85	2pm – 7pm	700	25,000	5-14
5	Brooklyn-Queens Expressway Bay Ridge Parkway to Shore Parkway	10/25/76	1.20	6am – 10am	360	13,000	15
TRANSIT STREETS							
6	49 th /50 th Streets, Manhattan Bus & Taxi corridor 34 th to 7 th Avenues	6/12/79	0.88	11am-4pm	230	7,500	7
7	Fulton Street, Brooklyn Pedestrian Transit Mall, Hanover place to Jay St.	12/01/80	0.30	24hours	1,520	76,800	N/A
TOTALS			6.22		3,620	157,500	

* No longer in operation

Source: New York City Department of Transportation, A Report on Policies and Programs, July 1983.

Table 2: Summary, Curb Bus Lanes in New York City

No.	Roadway & Limits	Starting Date	Length (miles)	Hours of Operation (Mon – Fri)	No. Of buses	No. Of Riders
Manhattan (Red Zones)						
1	Eighth Avenue 42 nd – 57 th Streets	4/23/79 9/21/82*	0.75	4pm – 7pm	180	3,500
2	Sixth Avenue 40 th Street – Central Park So.	6/01/78 9/08/82*	0.95	4pm – 7pm	280	18,400
3	Fifth Avenue 34 th – 59 th Streets	6/16/83*	1.12	7am – 7pm	1,480	38,500
4	Lexington Avenue 42 nd – 60 th Streets	6/22/83* 10/20/82*	0.90	7am – 7pm	383	15,500
5	Third Avenue 36 th – 58 th Streets	7/08/80 6/22/82*	1.10	7am – 7pm	355	16,900
6	Second Avenue 96 th – 14 th Streets	11/07/79 7/28/82*	4.10	7am – 10am & 4am - 7pm	160	8,100
7	First Avenue 34 th – 72 nd Streets	12/13/77 8/24/82*	1.90	4pm – 7pm	60	3,700
8	57 th Street, Avenue of Americas 2 nd Avenue, Eastbound only	12/20/71 8/17/82*	0.72	4pm – 7pm	345	13,900
9	42 nd Street 3 rd – 8 th Avenues	6/23/69 10/13/82*	2.00**	7am – 10am & 4am - 7pm	647	24,300
10	Church Street Battery Place – Warren Street	6/22/82 11/16/82*	0.75	7am – 10am	375	20,600
11	Broadway Warren Street – Battery Place	4/23/80 11/03/82*	0.73	4pm – 7pm	193	12,500
Staten Island						
12	Victory Boulevard Forst Avenue – Bay Street	5/20/63	2.00**	4pm – 7pm & 7am – 9am incl. Sat.	256	12,400
Queens						
13	Hillside Avenue, Francis Lewis Boulevard – 167 th St.	5/26/69	4.00**	7am – 9am	618	28,400
TOTALS			21.02		5,278	216,700

* Starting date of Red Zone installations ** Bus lanes in each direction on two-way street
Source: New York City Department of Transportation, A Report on Policies and Programs, July 1983.

**Table 3: Selected Characteristics of A.M. Peak Period Contra-flow Freeways- Bus lanes
(New York, New Jersey)**

Characteristic	Facility			
	NJ-495, New Jersey Approach to Lincoln Tunnel	I-495, Long Island Expressway	I-278 Gowanus Expressway	1996-2001
Date Implemented	December 1970	October 1971	October 1980	1996-2001
Major Agencies Involved	Port Authority, New Jersey DOT, NJ Turnpike Authority	New York City DOT	New York City DOT	New York City DOT, New York State DOT, MTA
Length in Miles	2.5	2.0	0.9	5.0
Hours of Operation	6:30 AM- 10 AM	7:00 AM- 10 AM	6:30 AM – 9:30 AM	6:00 AM- 10 AM
Eligible Vehicles	Buses over 16 passengers	Buses, Taxis	Buses, Taxis	Buses, Taxis, Carpools
Traffic Controls	Posts/Signs, Lane Control Signals	Signs, Cones	Posts/ Signs	Posts/Signs, Moveable Barriers
Peak Hour (Bus) and Passenger Volumes	650 (A) 25,000	(125) 5240	(176) 6180	11,000 Peak hour passengers in buses and carpools, over 7,000 in buses
Construction Cost	\$700,000	\$70,000	N/A	\$10 million
Operating Cost (per year)	\$400,000	\$150,000 (B)	N/A	N/A
Travel Time Savings Total (min/mile)	18 (7.2)	15 (7.5)	20 Max (22.2)	20 (4.0)
Remarks	Connects to Lincoln Tunnel with direct ramp to bus terminal	Lane Subsequently extended and opened to carpools		

NOTES

(A) About 830 buses and 30,000 to 35,000 people enter New York City through the Lincoln Tunnel. The 1997 NIMTC “Hub-bound Travel” report gives 31,200 people
 (B) Data as reported for 1980. In 2001, the combination of contra-flow and normal-flow bus/HOV lanes extends over 3 miles from the Verrazano Bridge to the Brooklyn-Battery Tunnel.

Table 4: New York City Local and Limited-Stop Bus Speeds

	Borough					
	<i>Manhattan</i>	<i>Bronx</i>	<i>Brooklyn</i>	<i>Queens</i>	<i>Staten Island</i>	<i>All</i>
# of Routes	7	4	3	6	5	2.5
General Route Type	Grid	Grid	Grid	Feeder	Feeder	
Miles (Avg)	9.9	7.6	8.4	6.6	8.6	8.3
Local Speed mph	8.0	10.2	8.5	12.4	14.2	10.7
Limited Speed mph	8.0	10.2	8.5	12.4	14.2	10.7
Local time (min)	97.1	55.6	68.9	38.3	41.2	54
Limited time (min)	78.1	44.7	59.1	32.1	36.6	47
Time Savings (min/mile)	1.9	1.4	1.2	0.9	0.5	0.9

Source:

Silverman, Norman, et al. "Limited Stop Bus Service at New York City Transit." *Practitioners Forum Journal of Transportation Engineering*, Vol 124, No. 6, November/December 1998, American Society of Civil Engineers.



Figure 1: Exclusive Bus Lane Serving New Jersey Through the Lincoln Tunnel

priority

bus treatments

Outside Midtown Manhattan

Bus Lanes

- ⑫ Church Street
- ⑬ Broadway
- ⑮ Hillside Avenue
- ⑰ Victory Boulevard

Exclusive lanes

- ⑭ Long Island Expressway Contra-flow
- ⑰ Gowanus Expressway Contra-flow
- ⑱ Brooklyn-Queens Expressway
- ⑳ I-495 Contra-flow

Transit streets

- ⑯ Fulton Street

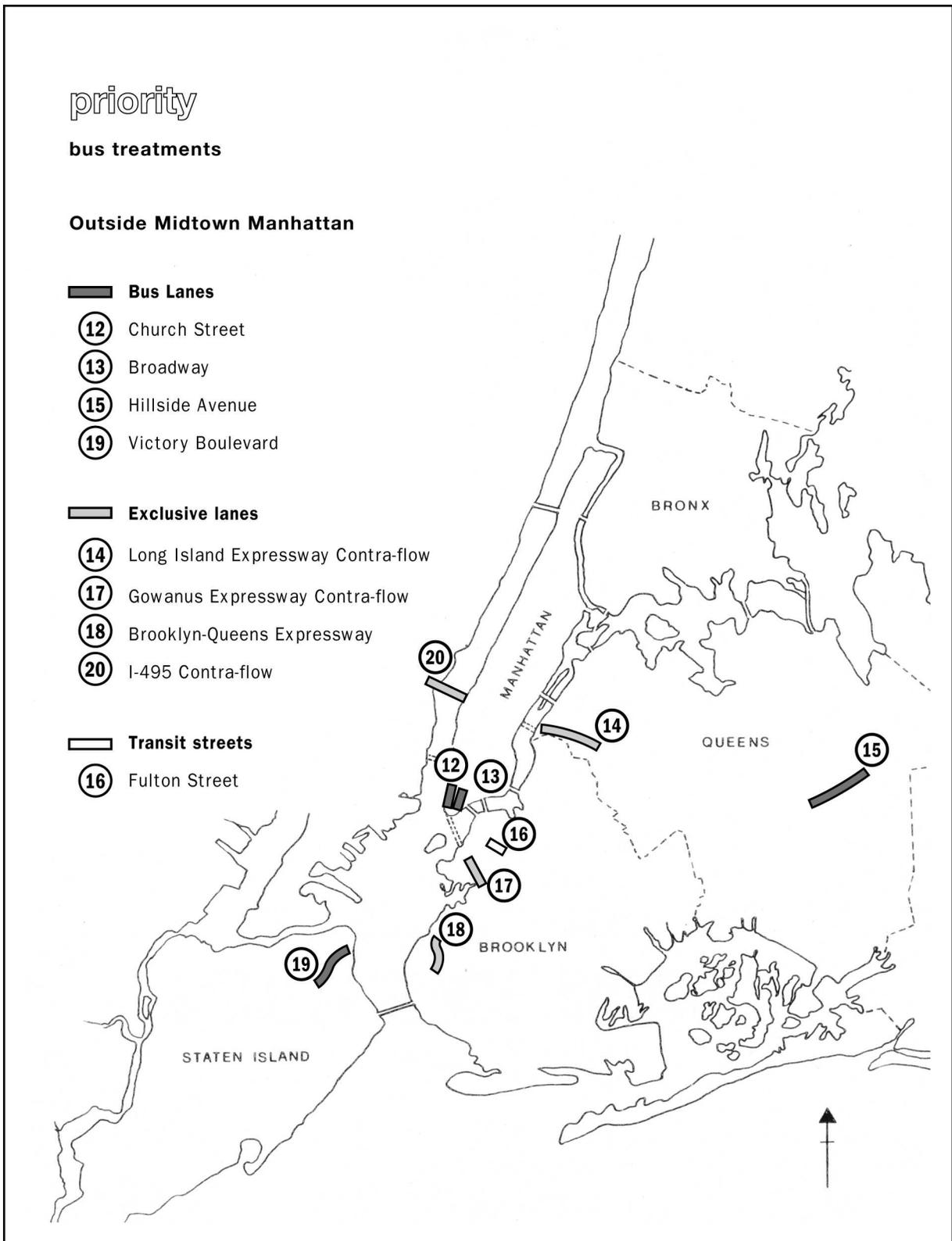


Figure 2: Outside Midtown Manhattan – Priority Bus Treatments

priority

bus treatments

Midtown Manhattan

-  **Bus Lanes**
- ① Eight Avenue
- ② Sixth Avenue
- ③ Lexington Avenue
- ④ Third Avenue
- ⑤ Second Avenue
- ⑥ First Avenue
- ⑦ 57th Street
- ⑧ 42nd Street
- ⑨ Fifth Avenue

-  **Exclusive lanes**
- ⑩ Madison Avenue

-  **Transit streets**
- ⑪ 49th - 50th Streets

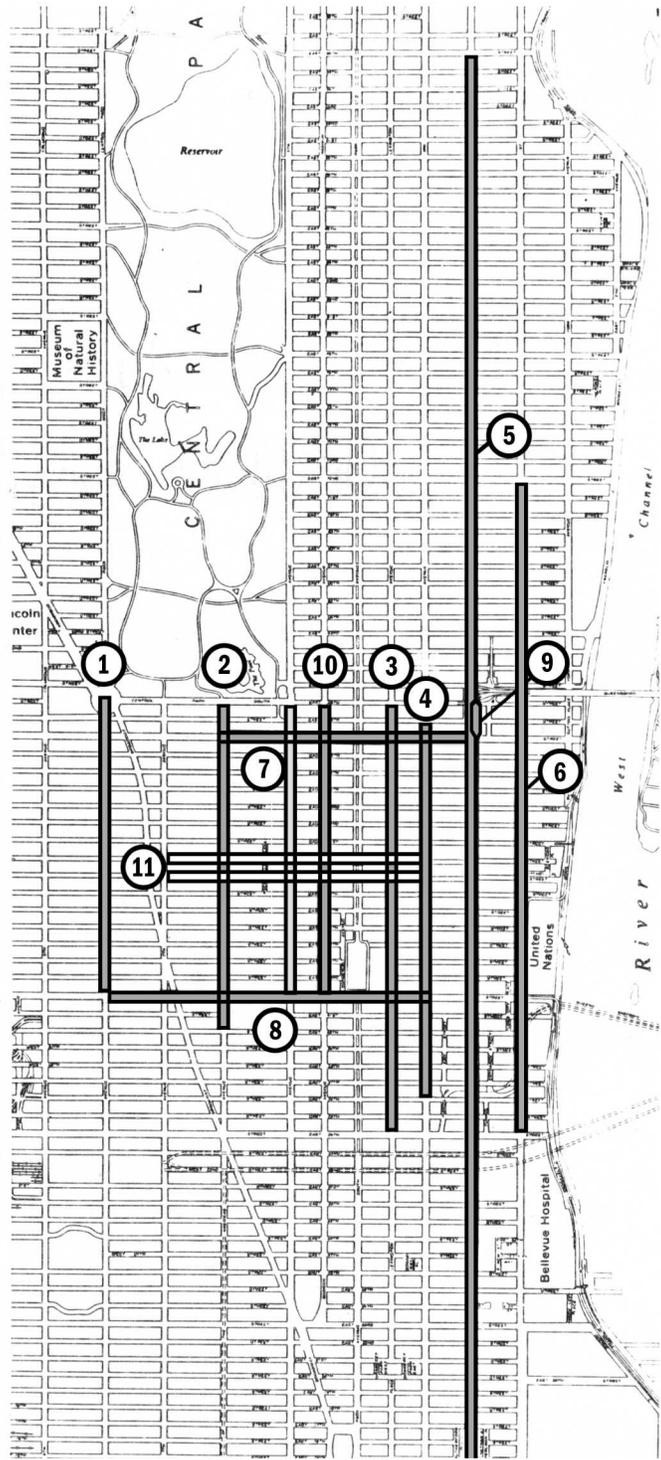


Figure 3: Midtown Manhattan – Priority Bus Treatments

Brooklyn Limited Stop Bus Routes



Figure 4: Brooklyn Limited-Stop Bus Routes

Bronx Limited Stop Bus Routes

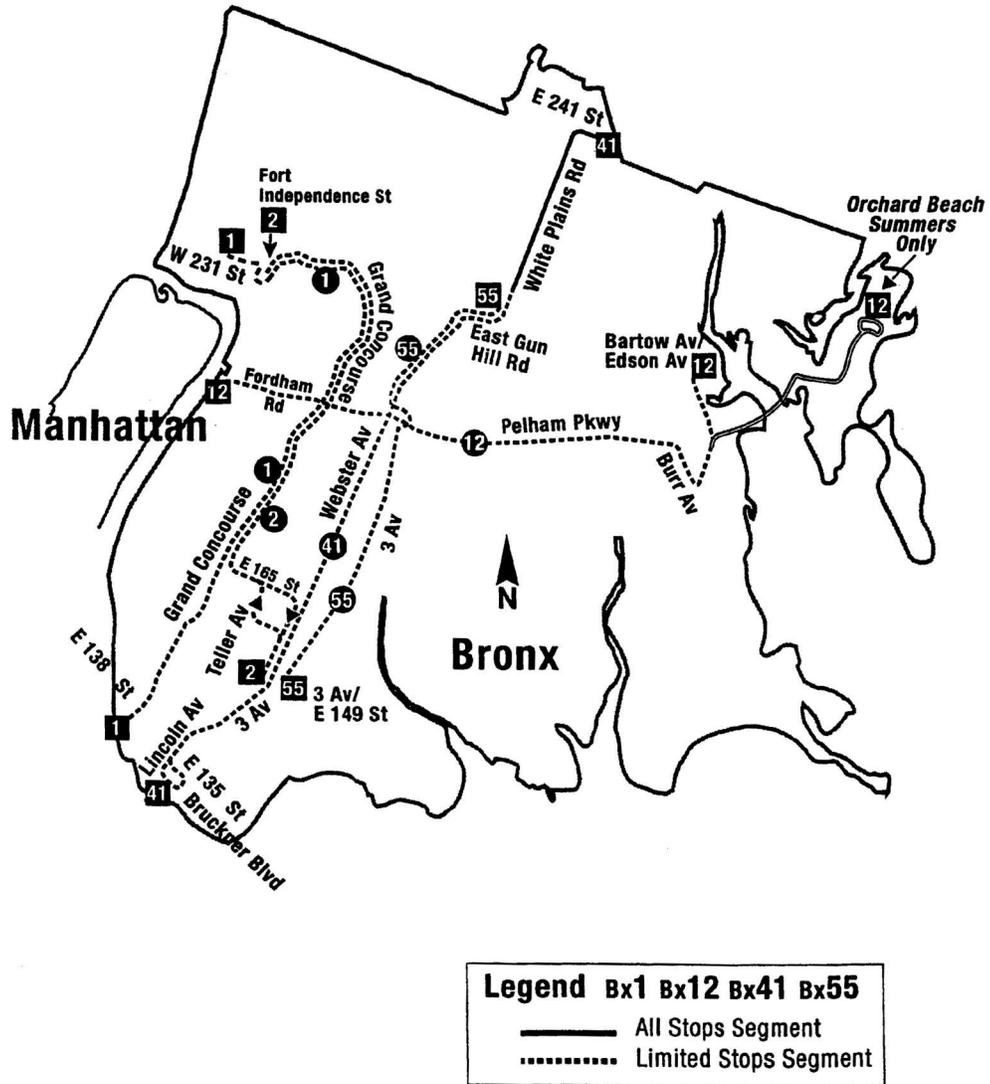


Figure 5: Bronx Limited-Stop Bus Routes

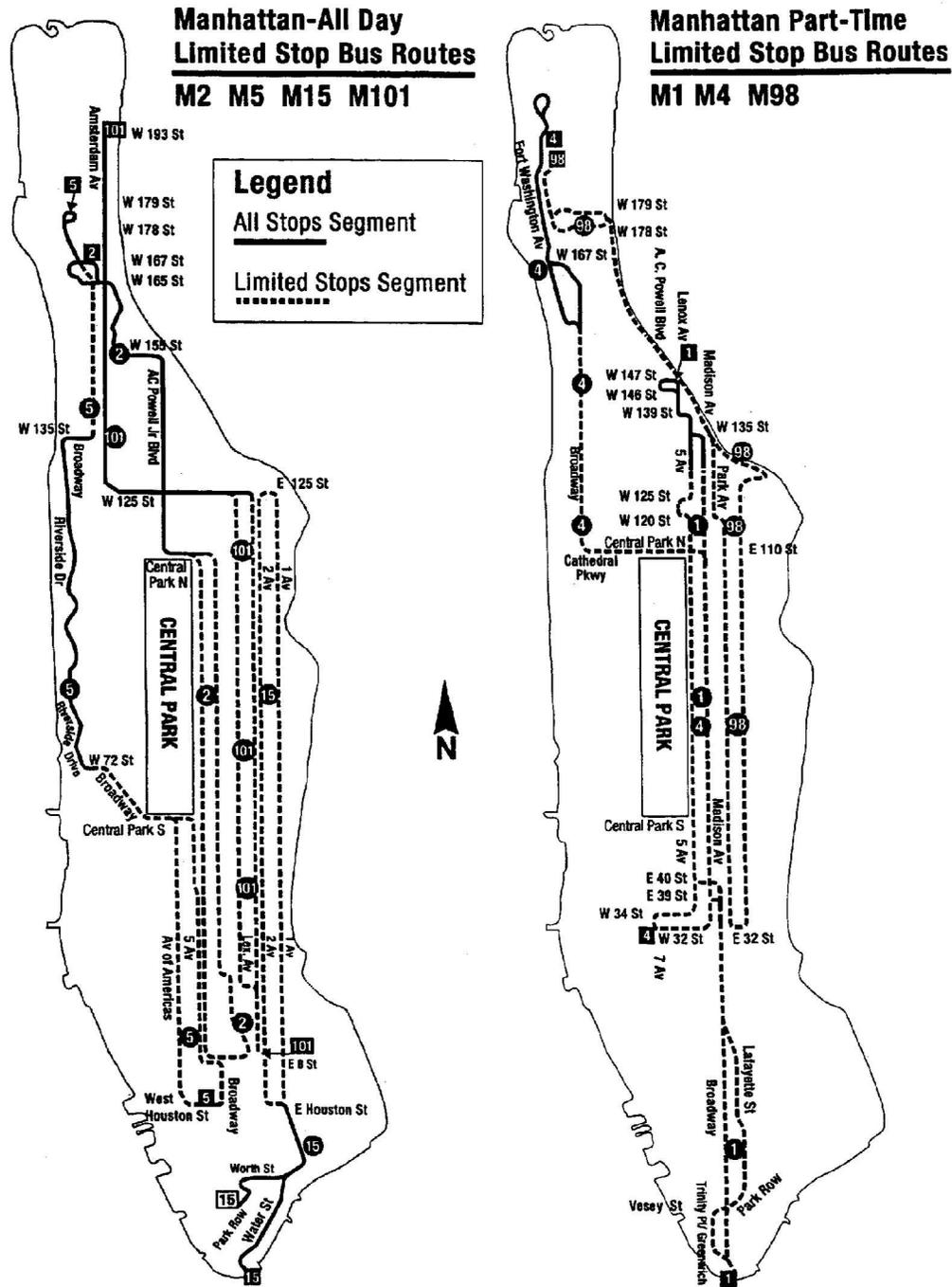


Figure 6: Manhattan All-Day and Part-Time Limited-Stop Bus Routes

Queens Limited Stop Bus Routes

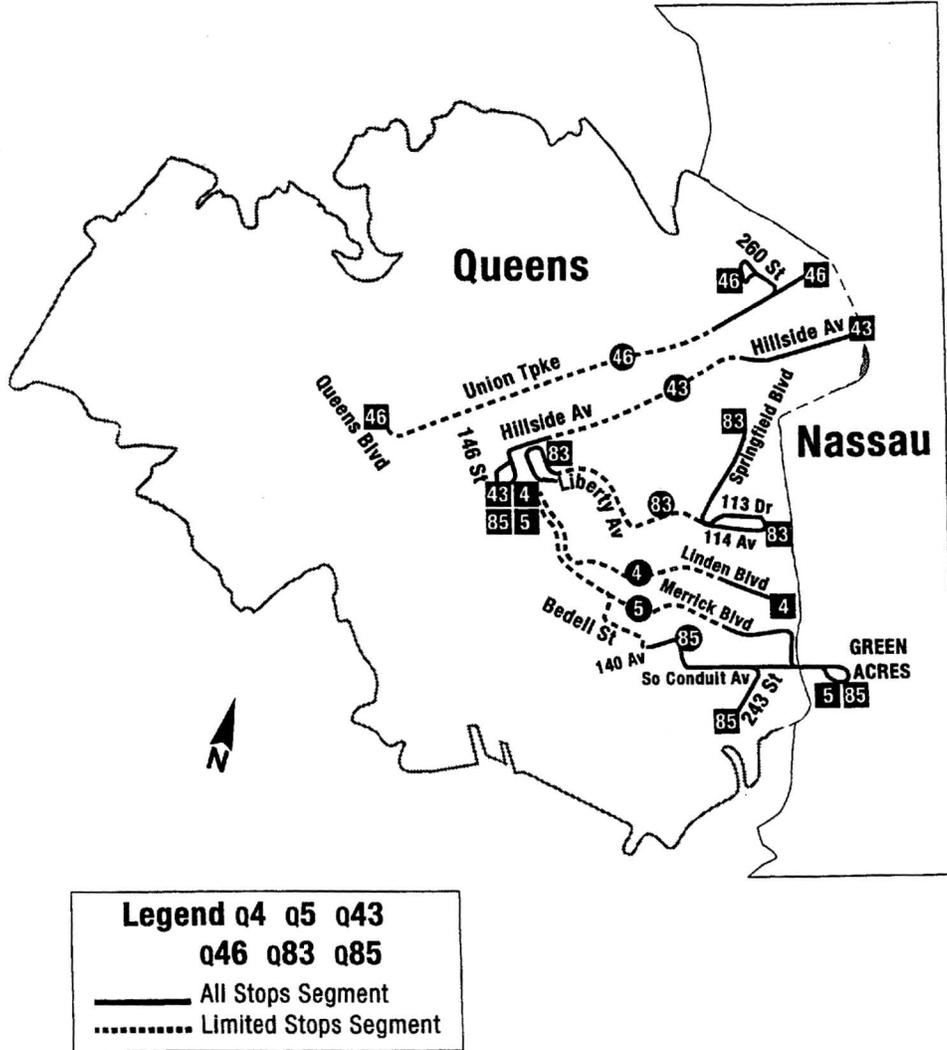


Figure 7: Queens Limited-Stop Bus Routes

Staten Island Limited Stop Bus Routes

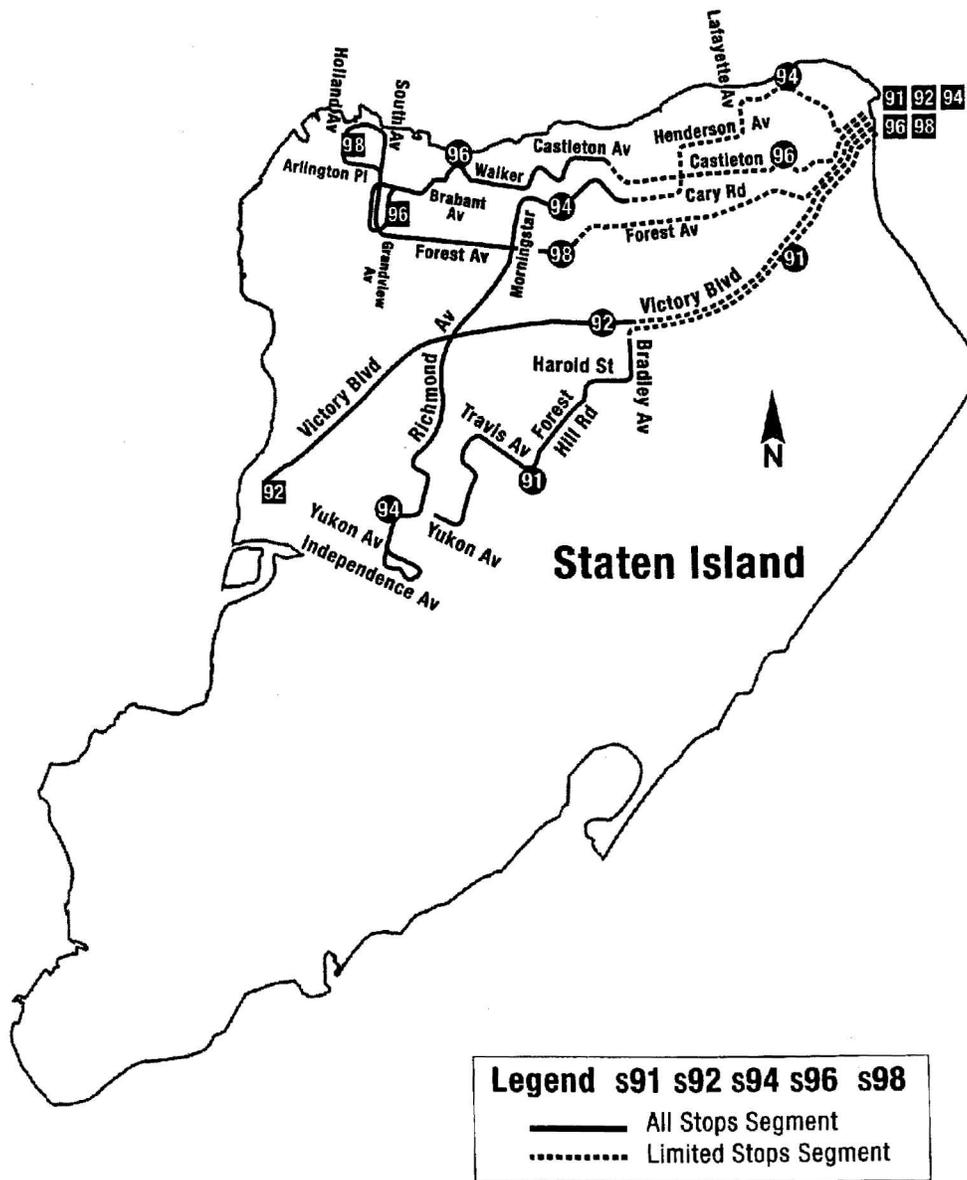


Figure 8: Staten Island Limited-Stop Bus Routes