Chapter 4 Operating and Financial Performance

This chapter provides an inventory of National Transit Database information and performance measures collected by each company. These include ridership (unlinked passenger trips), hours and miles of service provided, and cost and revenue figures. It is important to note that the data presented here was obtained by NYCDOT and National Transit Database reports, which was prepared by the individual companies. Data collected as part of the bus ridership survey is not presented in this chapter.

4.1 System Ridership, Vehicle Miles, and Vehicle Hours Trends (1997-2001)

Data for this section was obtained from a number of sources, covering the years 1997 through 2001. Ridership figures for the years 1997 through 2001 are presented for the private companies on Table 4-1. This data was compiled from 8.4.4. reports provided by the companies to NYCDOT. 8.4.4. reports are based on data collected from the fareboxes on each individual bus. A number of other data sources were considered including National Transit Database, as well as form 17A financial forms. Each individual ridership source reported ridership figures based on different data, resulting in different ridership figures from each source. Since 8.4.4.reports come directly from the farebox, it was decided that these figures were the most appropriate figures to use.

From 1997 to 2001, ridership grew by 22%. While all the companies have had significant gains in ridership, Triboro Coach has had the highest percent of ridership growth, with an increase of 34%. Queens Surface had the smallest ridership increase from 1997 however it still grew quite significantly, 17%.

There are a few likely reasons that ridership has increased substantially in the last few years. One reason that ridership has grown is because of discounts offered by Metrocard. These discounts have created free transfers for passengers who use the bus to access the subway. Also, the unlimited ride Metrocards has created an incentive for using bus service for discretionary trips. Also, increases in service, shown on Tables 4-2 and 4-3, have resulted in more people willing to use the private buses. The reduced fare on express buses, from $4.00 to $3.00 in 1997, has also increased the attractiveness of these services, resulting in more ridership.

Table 4-1: Ridership Trends

Company	1997	1998	1999	2000	2001	Percent Change
Green Bus Lines	29,262,754	31,596,643	33,723,379	35,050,405	35,773,019	18%
Jamaica Buses	8,555,007	8,229,040	10,236,127	11,059,522	11,081,463	23%
Liberty Lines	2,406,391	2,807,296	3,029,845	2,974,187	2,935,898	18%
New York Bus Service	2,949,000	3,255,553	3,191,314	3,943,879	4,014,399	27%
Queens Surface	24,025,523	24,619,882	26,509,757	28,079,215	29,029,359	17%
Triboro Coach	17,666,028	21,030,432	23,778,878	26,511,966	26,634,949	34%
Total	84,864,703	91,538,846	100,469,300	107,619,174	109,469,087	22%

Source: Form 8.4.4 Reports and NYCDOT

Vehicle miles grew by almost 12% between 1997 and 2001. The companies that have had the largest increase in vehicle miles, in both percent and actual miles, are companies that have a higher portion of express bus service. New York Bus Service had the highest percent increase in vehicle miles with a 24% increase, while Queens Surface saw the highest increase in actual miles, increasing by 904,392 miles since 1997. Liberty Lines actually experienced a slight decline in mileage since 1997, 41,016 miles or about 1% which is due to a new facility for express services located that reduced the deadhead miles operated by Liberty Lines. Vehicle Miles for each company from 1997 to 2001 is shown on Table 4-2.

The additional vehicle miles show that service has been added on many routes since 1997. Very little service has been added during peak periods due to equipment limitations. Much of the service has been increased during off-peak periods where buses would ordinarily sit idle at the depot. Midday service has seen a lot of growth, while growth in evening and nighttime periods has also occurred. Weekends are another time period where service has increased in recent years. Growth of express services are also a reason why vehicle miles have climbed, since these services tend to have a lot of deadhead mileage associated with them as they tend to operate only in one direction during peak periods.

Table 4-2: Vehicle Mile Trends

Company	1997	1998	1999	2000	2001	Percent Change
Green Bus Lines	5,827,675	6,260,059	6,664,710	6,733,294	6,559,348	13%
Jamaica Buses	2,181,703	2,223,517	2,232,158	2,226,155	2,227,443	2%
Liberty Lines	2,842,597	2,879,288	2,892,058	2,814,951	2,801,581	-1%
New York Bus Service	2,855,165	3,087,932	3,305,481	3,524,746	3,552,347	24%
Queens Surface	7,474,846	7,693,954	8,202,096	8,352,239	8,379,238	12%
Triboro Coach	4,193,050	4,183,877	4,608,787	4,715,577	4,841,272	15%
Total	25,375,036	26,328,627	27,905,290	28,366,962	28,361,229	12%

Source: NTD and NYCDOT

Table 4-3 shows vehicle hour trends from 1997 to 2001. Since 1997, vehicle hours have grown by about 19% or by 470,680 hours despite the large gains in ridership experienced by each company. Jamaica Buses has seen the least growth in vehicle hours, only increasing by 6,621 or 3% during this time period. New York Bus Service has grown by 23%, which is the highest percentage growth, while Triboro Coach has seen the most actual hour growth with 169,278 hours.

Vehicle hours have grown for a number of reasons. One reason is due to the increase in off-peak services provided that is shown on Table 4-3. Another reason is the increase in ridership, as shown on Table 4-1, has resulted in more crowding aboard buses, increasing the number of requested stops, and dwell time at those stops. Decreasing vehicle speeds

largely due to traffic congestion has also contributed to the large in increase in vehicle hours. Growth in express services is another reason that vehicles hours have grown. This is because these services tend to operate in peak directions primarily during peak periods, thus operate a lot of deadhead hours, as well as travel time that is affected by peak period traffic conditions in Manhattan and area expressways.

Table 4-3: Vehicle Hour Trends

Company	1997	1998	1999	2000	2001	Percent Change
Green Bus Lines	609,770	681,605	710,852	707,825	713,687	17%
Jamaica Buses	237,844	244,066	247,026	243,490	244,465	3%
Liberty Lines	230,509	228,591	230,259	228,241	266,479	16%
New York Bus Service	242,750	261,167	279,781	297,245	298,504	23%
Queens Surface	665,800	693,062	729,943	754,821	764,940	15%
Triboro Coach	427,666	443,252	491,260	577,929	596,944	40%
Total	2,414,339	2,551,743	2,689,121	2,809,551	2,885,019	19%

Source: NTD and NYCDOT

The amount of vehicle miles, or amount of service provided has not kept pace with ridership (72% increase in ridership, 12% increase in miles, 19% increase in hours). The impact of this is that franchised buses tend to be crowded and delayed. This could limit the potential for additional increases in ridership, especially during peak periods.

4.2 Ridership by Fare Type

One month ridership by fare type data were made available for the month of October 2002, and is presented on Table 4-4. This data comes from very detailed farebox reports from each individual route. This table shows that almost a quarter of all passengers pay with an unlimited ride Metrocard. Another 18% of passengers pay their fare with local stored value Metrocard. 18% of passengers also use free transfers to board a second bus. 11% of riders pay their fare with cash and ride during off-peak times. Express riders constitute a lower percent of the total ridership; however 8% of all riders use express Metrocards, either pay per ride or the express unlimited card. Senior citizens tend to pay in cash during off-peak periods, with a total of 3% being senior off-peak cash passengers. There are numerous fare types used by less than 1 percent of passengers. Overall, approximately 54% of passengers pay using a Metrocard, either unlimited or pay per ride. Ridership for each company correlates with the amount of service provided by each company, with Green Bus Lines, which operates the most service, carrying the most passengers. Liberty Lines, which provides the least service, carries the least amount of passengers.

Table 4-4: Ridership by Fare Type (October 2002)

Fare Type	Green Bus Lines	Jamaica Buses	Liberty Lines	New York Bus Service	Queens Surface*	Triboro Coach	Total	Percent
Local Off-Peak Fare	389,284	95,143	0	0	291,302	160,209	935,938	11%
Local Peak Fare	165,435	45,390	667	0	349,927	84,143	645,562	8%
Local Metrocard	411,945	112,736	0	0	697,119	295,691	1,517,491	18%
Local Unlimited Metrocard	1,002,155	267,979	0	0	NA	709,874	1,980,008	23%
Express Fare	1,738	1,030	89,355	100,701	183,151	4,765	380,740	4%
Express Metrocard	25,122	11,744	106,485	149,275	7,555	70,230	370,411	4%
Express Unlimited Metrocard	693	853	35,344	14,857	NA	1,463	53,210	>1%
Step Up Fare	0	0	0	0	16,051	0	16,051	>1%
Senior Off-Peak Local Fare	106,540	25,180	10	0	64,166	60,850	256,746	3%
Senior Peak Local Fare	36,467	11,119	1	0	33,088	20,792	101,467	1%
Senior Local Metrocard	28,078	7,843	0	0	NA	26,465	62,386	>1%
Senior Unlimited Local Metrocard	15,722	3,749	0	0	NA	13,135	32,606	>1%
Senior Off-peak Express Fare	154	3	6,185	7,391	10,862	173	24,768	>1%
Senior Peak Express Fare	49	4	0	0	0	37	90	>1%
Senior Off-peak Express Metrocard	166	10	0	6,653	0	280	7,109	>1%
Senior Peak Express Metrocard	399	151	0	0	0	861	1,411	>1%
Employee and Other Free	9,982	1,800	0	1,863	0	3,302	16,947	>1%
Free Transfers	598,960	170,218	0	27,261	368,147	368,215	1,532,801	18%
Student Metrocard	238,206	79,852	0	0	23,626	128,917	470,601	6%
Student Half Fare	29,734	8,161	0	0	21,677	29,444	89,016	1%
Student Express Fare	445	229	0	3,977	0	598	5,249	>1%
Total	3,061,274	843,194	238,047	311,978	2,066,671	1,979,444	8,500,608	100%

***Queens Surface does not report Metrocard Ridership by Type Due to rounding values do not equal 100%**
Source: NYCDOT

4.3 Operating Expenses and Revenues

Table 4-5 shows the total revenue and expenses for the private carriers in the Bronx and Queens for fiscal year 2001. This table shows that total revenue falls short by over two million dollars of covering expenses incurred for the services these companies provide. Only one company, New York Bus Service, receives more revenue than the cost for services. Triboro Coach has the largest deficit, which is very close to two million dollars. Also shown on this table is directly generated revenue, which is revenue from fares paid to the farebox, as well as from a few other direct sources. Directly generated revenue is used to calculate the farebox recovery (percent of costs that come from directly generated sources), which is 40% for the six companies as a whole. New York Bus Service, with a farebox recovery of 44%, is the highest, while Jamaica Buses 31% farebox recovery is the lowest.

National Transit Database form 301 provides the operating expenses for each of the companies. Operations are the highest of all the cost categories, representing approximately 58% of all operating expenses. Operations include driver wages and fringe benefits. Vehicle maintenance expenses are also very high, which is not surprising since this represents the cost to maintain the aging fleet. Costs are generally consistent with the amount of service provided by each company. Table 4-6 provides an overview of the operating expenses for each company.

Revenues for the franchised bus services come from two primary sources, directly generated revenue and the purchase of service agreement that the companies have with the city (city subsidies). Directly generated revenue includes such items as farebox and advertising revenue. Two of the companies, New York Bus Service and Liberty Lines have a small amount of revenue that comes from other sources. For Liberty Lines, this is listed as Auxiliary Transportation Funds and for New York Bus Service, it is listed as Non-Transportation Funds. All public revenue sources that are used to fund services provided by the private carriers are passed through New York City Department of Transportation as the purchase of service agreement. The city owns most of the vehicles, so the individual companies do not receive capital funding. Table 4-7 gives an overview of revenue for each company by source, as reported in the 2001 National Transit Database on form 203.

Table 4-5: Revenue and Expenses (FY 2001)

Company	Directly Generated Revenue	Total Revenue	Total Expenses	Surplus (Deficit)	Farebox Recovery
Green Bus Lines	$26,581,810	$62,008,001	$62,735,583	($727,582)	43%
Jamaica Buses	$8,356,942	$26,227,011	$26,903,728	($676,717)	31%
Liberty Lines	$7,727,512	$18,507,678	$18,656,607	($148,929)	41%
New York Bus Service	$10,511,311	$25,270,066	$23,826,415	$1,443,651	44%
Queens Surface	$31,304,863	$79,979,788	$79,979,789	($1)	39%
Triboro Coach	$22,722,858	$51,378,527	$53,371,845	($1,993,318)	43%
Total	$107,205,296	$263,371,071	$265,473,967	(2,102,896)	40%

Source: NTD and NYCDOT

Table 4-6: Operating Expense (FY 2001)

Company	Operations		Vehicle Maintenance		Non-Vehicle Maintenance		General Administration		Total
	Actual	Percent	Actual	Percent	Actual	Percent	Actual	Percent	
Green Bus Lines	$37,510,788	60%	$16,745,936	27%	$1,469,076	2%	$7,009,783	11%	$62,735,583
Jamaica Buses	$15,909,198	59%	$7,007,766	26%	$711,979	3%	$3,274,785	12%	$26,903,728
Liberty Lines	$11,757,211	63%	$5,122,558	27%	$162,759	1%	$1,614,079	9%	$18,656,607
New York Bus Service	$15,821,334	66%	$3,482,946	15%	$1,020,022	4%	$3,502,113	15%	$23,826,415
Queens Surface	$42,050,768	53%	$29,335,892	37%	$675,873	1%	$7,917,256	10%	$79,979,789
Triboro Coach	$31,854,737	60%	$14,995,821	28%	$1,350,364	3%	$5,170,923	10%	$53,371,845
Total	$154,904,036	58%	$76,690,919	29%	$5,390,073	2%	$28,488,939	11%	$265,473,967

Source: NYCDOT

Table 4-7: Revenue by Source (FY 2001)

Company	Directly Generated		Purchase of Service Agreement		Other		Total
	Actual	Percent	Actual	Percent	Actual	Percent	
Green Bus Lines	$26,581,810	43%	$35,426,191	57%	$0	0%	$62,008,001
Jamaica Buses	$8,356,942	32%	$17,870,069	68%	$0	0%	$26,227,011
Liberty Lines	$7,727,512	42%	$10,316,499	56%	$463,667	3%	$18,507,678
New York Bus Service	$10,511,311	42%	$14,158,755	56%	$600,000	2%	$25,270,066
Queens Surface	$31,304,863	39%	$48,674,925	61%	$0	0%	$79,979,788
Triboro Coach	$22,722,858	44%	$28,655,669	56%	$0	0%	$51,378,527
Total	$107,205,296	41%	$155,102,108	59%	$1,063,667	0%	$263,371,071

Source: NYCDOT

Chapter 5 Performance Indicators

This chapter provides an analysis of each of the companies based on key performance indicators. Performance indicators are based on data provided by NYDOT and the NTD rather than ridecheck data collected for the study. While the previous chapter provides an overview of services provided (in terms of miles and hours) as well as services consumed (ridership) and costs, performance indicators can show how efficiently service is being provided by showing how much service is being consumed for each unit of service being provided, and how cost effective that service is. This chapter provides an overview of major performance indicators of two categories for each of the companies, productivity indicators, and cost indicators. These same performance indicators are provided for each individual route in the route profiles located in appendix B.

5.1 Productivity Indicators

Productivity indicators are the performance indicators that refer to the amount of service consumed per amount of service provided. The two most common service indicators are passengers per hour and passengers per mile. Passengers per hour refer to the number of unlinked passengers for each hour of service provided. Passengers per mile refer to the number of unlinked passengers per mile of service provided. Table 5-1 displays the service indicators for the franchised carriers in the Bronx and Queens.

The six carriers in the Bronx and Queens combine to carry 37.94 passengers per hour and 3.86 passengers per mile. Green Bus Lines carries the most passengers, carrying 50.12 passengers per hour. On the other end of the spectrum, Liberty Lines only carries 11.02 passengers per hour. In general, companies that have a higher number of express routes tend to have lower passengers per mile, since express routes tend to travel a high number of miles without stopping to pick up passengers.

Table 5-1: Productivity Indicators

Company	Passengers per Hour	Passengers per Mile
Green Bus Lines	50.12	5.45
Jamaica Buses	45.33	4.97
Liberty Lines	11.02	1.05
New York Bus Service	13.45	1.13
Queens Surface	37.95	3.46
Triboro Coach	44.62	5.50
Total	37.94	3.86

5.2 Cost Indicators

Cost indicators are used to show the cost per unit of service provided, or consumed. The three cost indicators used are cost per passenger, cost per hour, and cost per mile. Cost per passenger details the cost of service per passenger that uses the service. Cost per hour details the cost of service on an hourly basis. Cost per mile shows the cost for each

mile of service provided. Table 5-2 provides on overview of the cost indicators as a whole from the total company expenses. Since only one expense category, operations, represents the actual expense for actually providing service, a separate table, Table 5-3, provides an overview of cost indicators based on operations costs only.

For the total cost indicators, the franchised carriers have a cost per passenger of $2.43, a cost per hour of $92.73, and a cost per mile of $9.85. The highest cost per passenger is incurred by Liberty Lines at $6.35 per passenger, while Green Bus Lines, at $1.75, has the lowest cost per passenger. Jamaica Buses has the highest cost per hour at $110.05, and New York Bus Service has the lowest cost per hour at $79.82. Triboro Coach has the highest cost per mile at $11.91, while Liberty Lines has the lowest cost per mile at $6.66. Table 5-2 shows that companies that operate more local services tend to have a lower cost per passenger, however express services have lower costs per hour and mile.

Table 5-2: Cost Indicators

Company	Cost per Passenger	Cost per Hour	Cost per Mile
Green Bus Lines	$1.75	$85.74	$11.39
Jamaica Buses	$2.43	$110.05	$12.08
Liberty Lines	$6.35	$82.38	$6.66
New York Bus Service	$5.94	$79.82	$6.71
Queens Surface	$2.76	$104.56	$9.54
Triboro Coach	$2.00	$89.41	$11.91
Total	$2.43	$92.73	$9.85

Looking only at operations costs, the cost per passenger is $1.42, the cost per hour is $54.11, and the cost per mile is $5.75 for the Bronx and Queens franchised carriers. The highest cost per hour is Liberty Lines at $4.00, while at $1.05 Green Bus Lines has the lowest cost per passenger. Jamaica Buses has the highest cost per hour at $65.08, while Green Bus Lines has the lowest cost per hour at $51.27. Jamaica Buses also has the highest cost per mile at $7.14, while Liberty Lines has the lowest cost per mile at $4.20. Table 5-3 shows the same thing as Table 5-2, that local services have lower costs per passenger, while express services have lower costs per hour and mile.

Table 5-3: Cost Indicators (Operations Costs Only)

Company	Cost per Passenger	Cost per Hour	Cost per Mile
Green Bus Lines	$1.05	$51.27	$6.81
Jamaica Buses	$1.44	$65.08	$7.14
Liberty Lines	$4.00	$51.91	$4.20
New York Bus Service	$3.94	$53.00	$4.45
Queens Surface	$1.45	$54.97	$5.02
Triboro Coach	$1.20	$53.36	$7.11
Total	$1.42	$54.11	$5.75

Chapter 6 Ridership Analysis

This chapter provides an overview of the ridecheck survey conducted for the New York City Department of Transportation Franchised Bus services in Queens and the Bronx, as well as an overview of the ridership data collected. Ride-checks were conducted from October 30th until December 15th, 2002. Stop by stop ride-checks were conducted for local routes, while maximum load point counts were conducted for express routes within the same time period as local counts.

6.1 Local Ridership

The ridecheck survey for local buses was performed by on-board surveyors counting when and where passengers boarded and alighted, on a random sample of individual bus trips on every bus route. Each surveyor was provided with a ridecheck form, consisting of bus stop locations, and times at major timepoints for each trip that was sampled. An example of a ridecheck form is provided in Appendix D. Surveyors recorded boardings and alightings at each stop, and times that the bus departed from major time-points.

The sampling methodology was established by the University Transportation Research Center (UTRC). An overall survey sample size of 50% on weekdays and 40% on weekends was employed for local bus routes. Based on this sampling size, UTRC developed a methodology for determining the number of hours to be sampled for each route and then randomly selected the sample using driver runs (piece of work consisting of multiple one-way trips) as the basic unit. Details of this methodology are contained in Appendix C. It should be noted that the methodology resulted in smaller routes having a higher percentage of service hours sampled than others. This was done on purpose to ensure that those routes would produce an absolute count large enough to be meaningful. For most routes, the number of trips surveyed was slightly less than what was called for in the sampling plan. Some of the reasons that an individual trip might not have been counted include an entire run being cancelled by the company, the bus running late or weather concerns that forced a trip to be cancelled, or buses breaking down in the middle of the route. In instances where a surveyor missed his or her run, every possible effort was made to reassign a surveyor to that run the on the following day or week. The few trips missed for individual routes should not affect the overall usefulness of the sample.

Individual Route Ridership

Individual route ridership was estimated based on the ridership sample data collected. For local routes, ridership was estimated using average ridership per trip for each given hour and applying that average to the number of trips operated in the given hour. Adding each hour together yielded the ridership for the entire day. Route Q10 has the highest ridership of all routes, carrying 26,544 passengers on weekdays, 15,796 on Saturdays, and 12,408 on Sundays. Other routes with high ridership include the Q6, Q11, Q19A, Q23, Q25, Q60, Q65, Q65A, Q66, Q111, and Q113. Table 6-1 gives an overview of ridership for the local bus routes.

Table 6-1: Estimated Average Daily Local Ridership

Company	Route	Weekday	Saturday	Sunday
Green Bus Lines	Q6	14,289	6,951	4,217
	Q7	5,542	2,314	1,799
	Q8	8,602	4,974	3,367
	Q9	6,154	3,105	2,032
	Q9A	151	No Service	No Service
	Q10	26,544	15,796	12,408
	Q11	15,578	9,206	6,937
	Q21	591	299	290
	Q22	9,512	4,374	3,252
	Q35	5,108	3,529	2,290
	Q37	6,612	2,698	2,339
	Q40	7,052	3,579	2,386
	Q41	9,788	5,133	2,386
	Q60	15,301	13,900	10,974
Jamaica Buses	Q110	7,876	4,295	2,131
	Q111	16,387	5,309	2,806
	Q112	5,258	2,508	1,184
	Q113	11,346	7,083	5,328
Queens Surface	Q25	12,855	10,422	6,529
	Q34	7,897	No Service	No Service
	Q65	22,039	7,759	5,317
	Q65A	11,178	3,461	2,897
	Q66	13,882	8,465	5,825
	Q67	2,207	126	17
	Q101	4,821	2,197	1,253
	Q101R	3,313	2,918	2,190
	Q102	3,280	1,719	1,257
	Q103	453	No Service	No Service
	Q104	2,818	1,546	1,138
	QBx1	9,184	3,958	2,672
Triboro Coach	Q18	9,374	4,878	3,358
	Q19	475	148	119
	Q19A	12,163	3,499	2,290
	Q19B	6,794	3,509	2,518
	Q23	16,642	7,775	5,887
	Q29	6,844	3,117	2,267
	Q33	8,633	6,277	4,527
	Q38	7,518	2,940	2,184
	Q39	7,163	2,012	1,102
	Q45	3,590	1,008	514
	Q47	3,952	1,225	852
	Q53	2,063	1,209	816
	Q72	7,213	3,888	2,296

For the following sections and all the charts that are presented, the actual sample rather than estimated average daily totals are used.

Ridership by Time of Day

On weekdays, sampled ridership for all four companies peaks during the rush hour periods, from 5:00 AM until 9:00 AM and from about 3:00 PM until 6:00 PM. For each company, the hour that has the single highest number of boardings is the hour from 7:00 AM until 8:00 AM, which is during the AM peak period. In the evenings, ridership falls off after 8:00 PM, and remains low until the AM peak period at 5:00 AM. Figures 6-1 through 6-4 provide on overview of ridership, showing the number of boardings in each hour for each of the four companies that operate local bus service. Green Bus Lines, which is the company that operates the most local service, has the highest ridership each hour.

Saturday ridership shows a different pattern than weekday ridership. Boardings for each company tend to peak towards the early or middle part of the afternoon, somewhere between 12:00 PM and 4:00 PM. Ridership in the evening on Saturdays does not fall off as drastically as it does on the weekdays. Green Bus Lines also has the highest ridership for most hours on Saturdays. Figures 6-5 through 6-8 show the number of boardings for each company on Saturdays.

The ridership pattern for Sunday is very similar to the Saturday ridership pattern. The number of boarding's peak in the early or middle parts of the afternoon. Evening ridership does not decline quite as quickly as during weekdays. This is shown for each company on Figures 6-9 through 6-12.

Passenger Activity by Stop

The route profiles in appendix B show passenger activity by stop for each route. The stops that have higher ridership tend to be stops at subway stations and other major traffic generators such as hospitals, school, and shopping centers. Other stops that have higher ridership are locations where transfers to major arterial bus routes are available. Most other stops are located in neighborhoods and tend to have lower ridership. Table 6-2 lists the bus stops that have the most passenger activity on weekdays. All of these stops are located at or near subway stations, and in places where transfers to many other bus routes are available.

Figure 6-1: Green Bus Lines Weekday Local Route Boardings By Hour

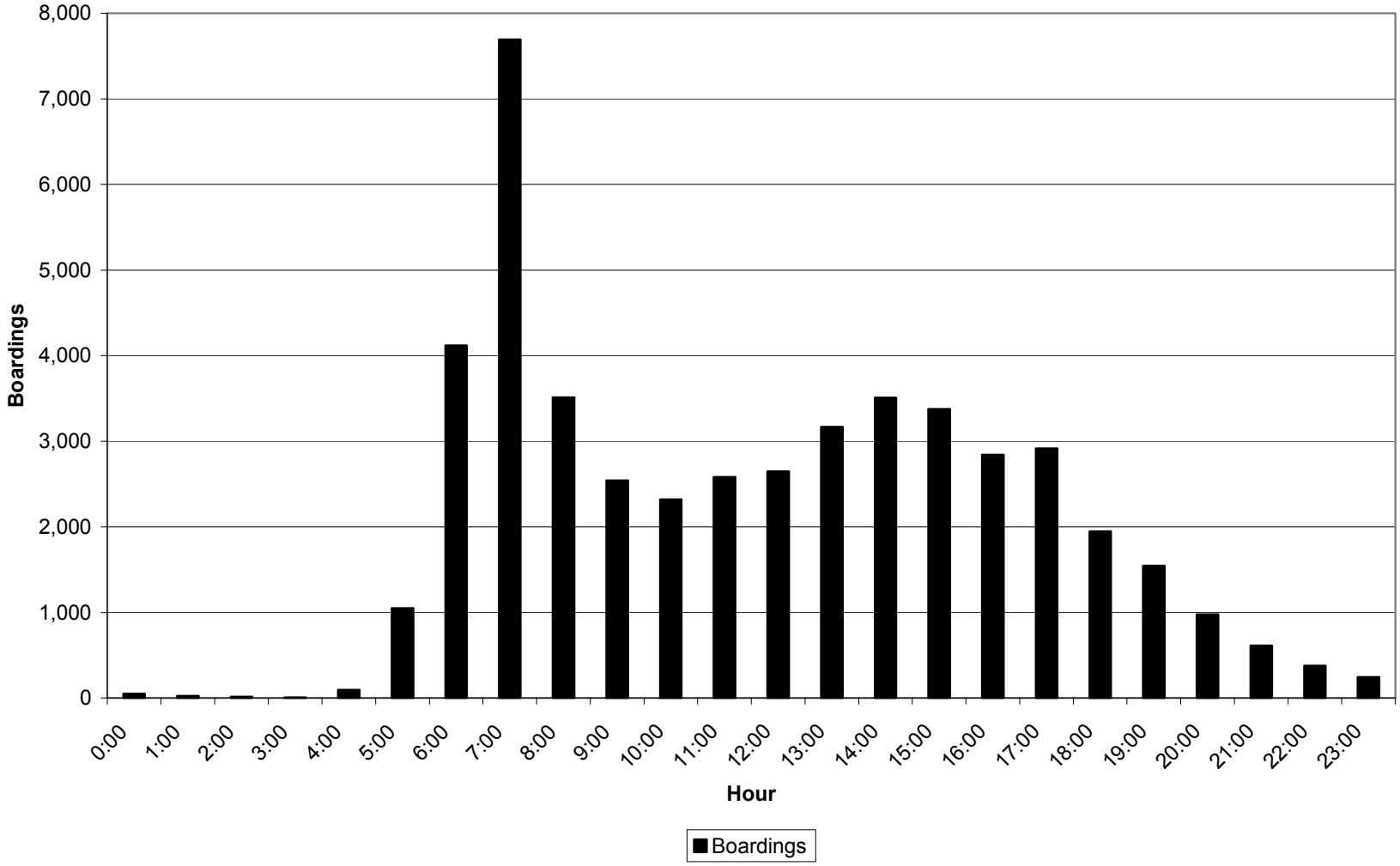


Figure 6-2: Jamaica Buses Weekday Local Route Boardings By Hour

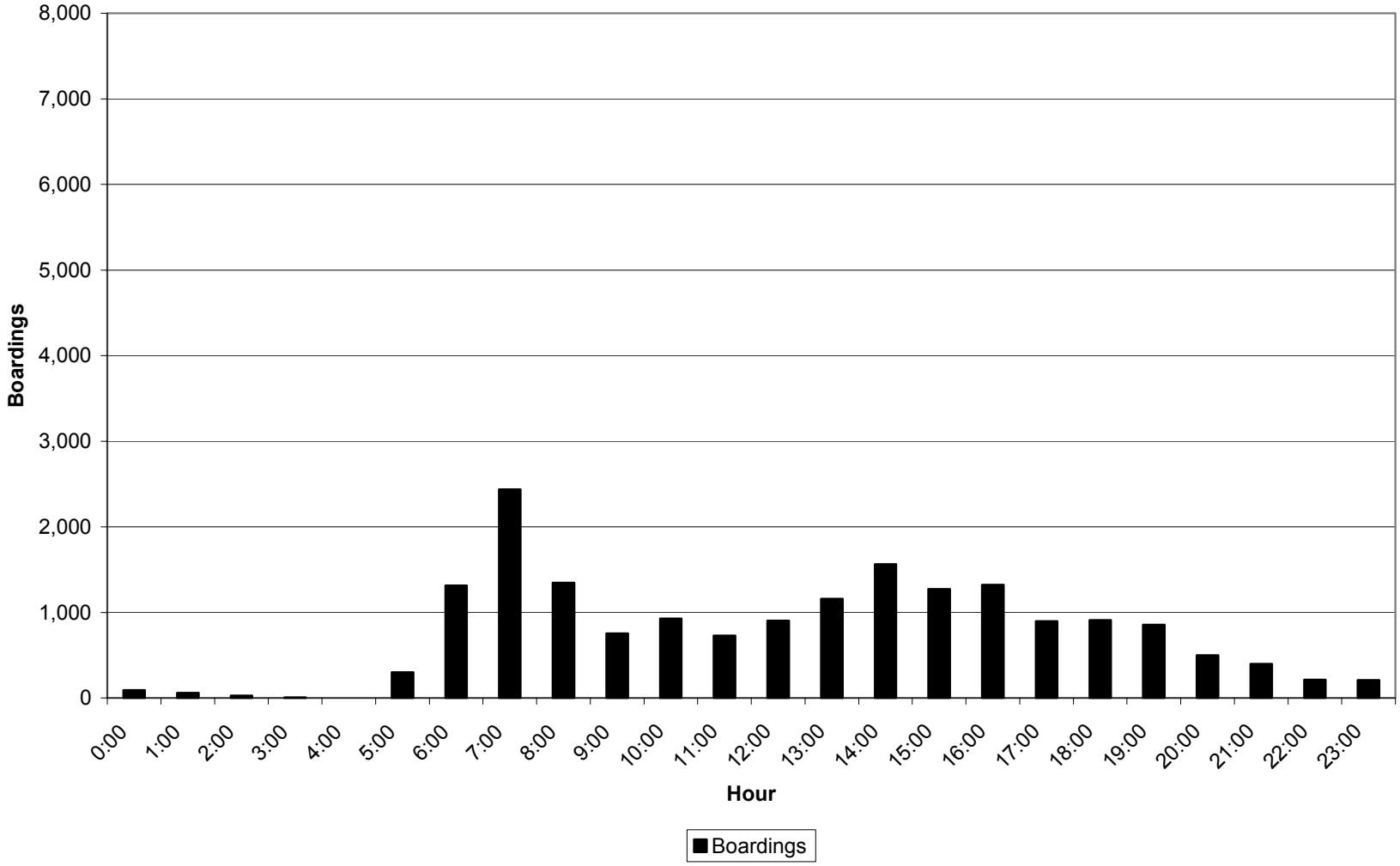


Figure 6-3: Queens Surface Weekday Local Route Boardings By Hour

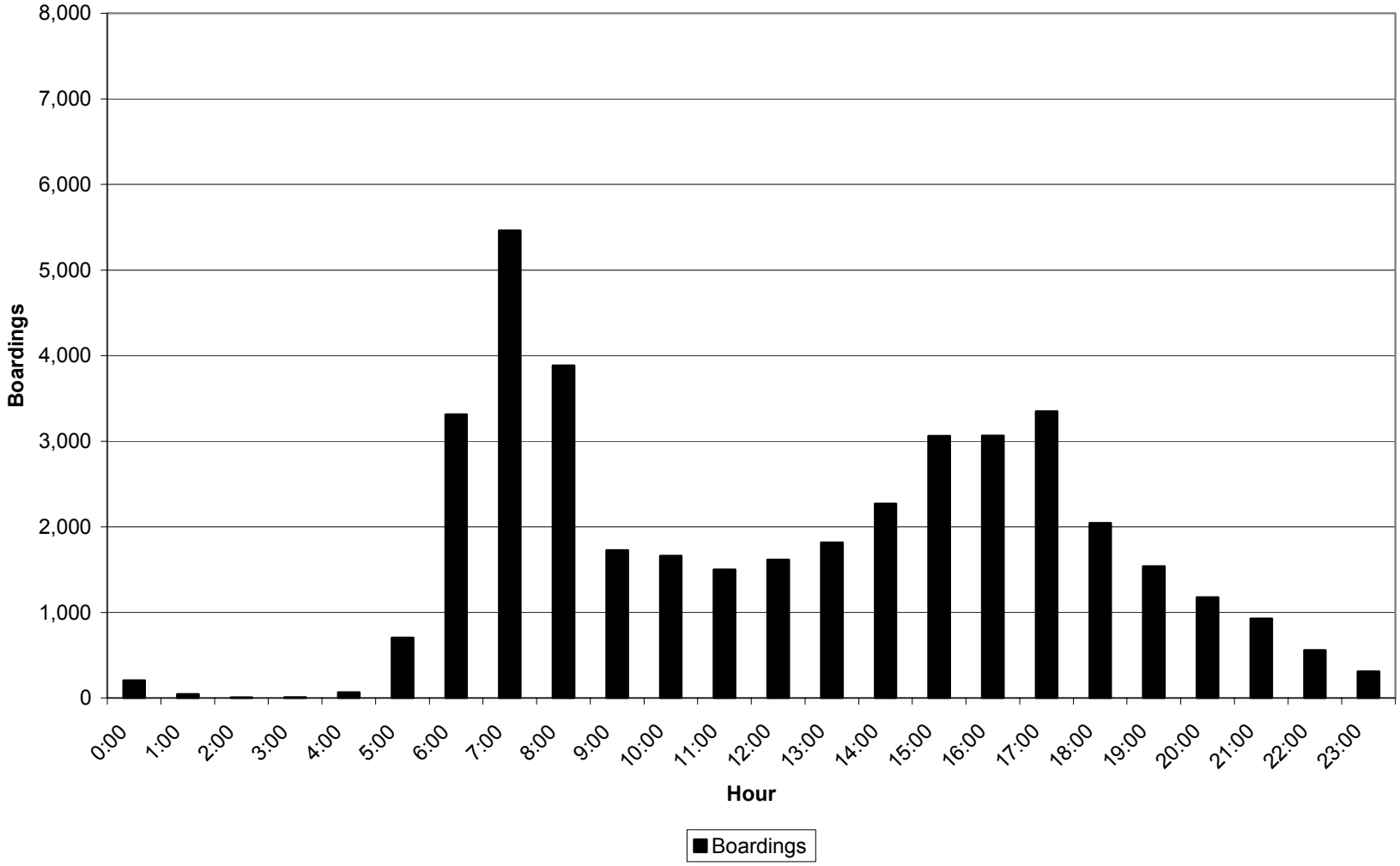


Figure 6-4: Triboro Coach Weekday Local Route Boardings By Hour

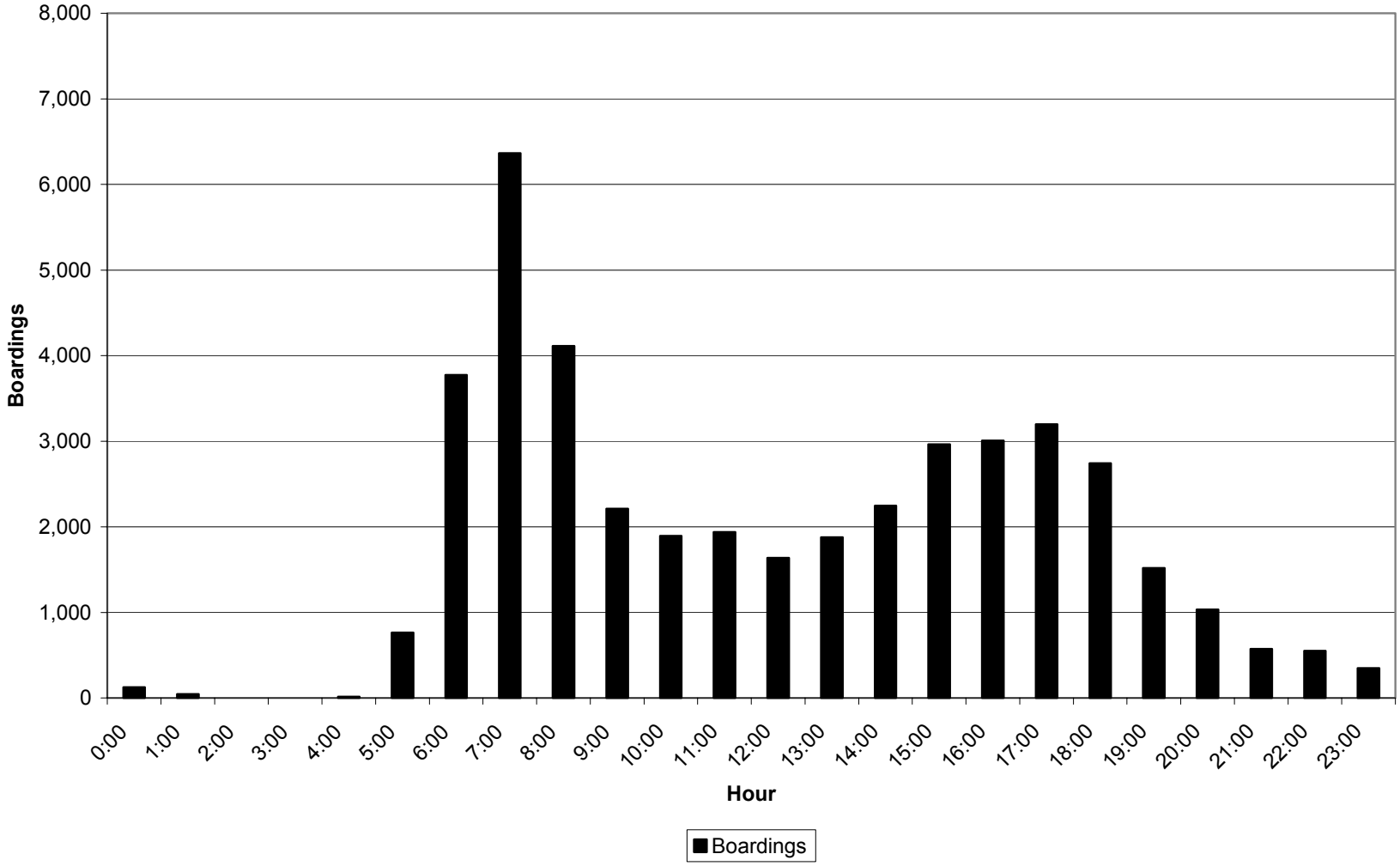


Figure 6-5: Green Bus Lines Saturday Local Route Boardings By Hour

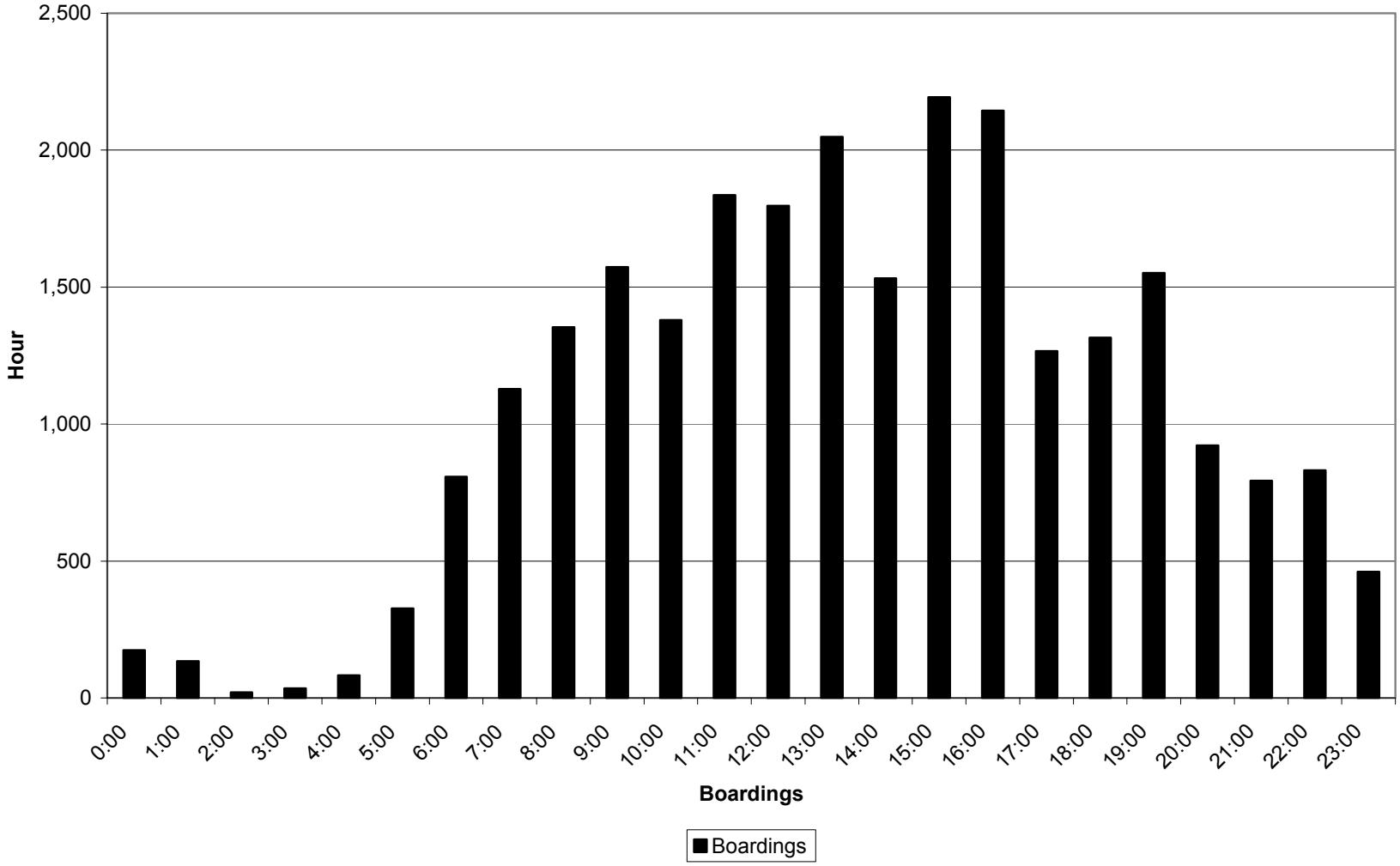


Figure 6-6: Jamaica Buses Saturday Local Route Boardings By Hour

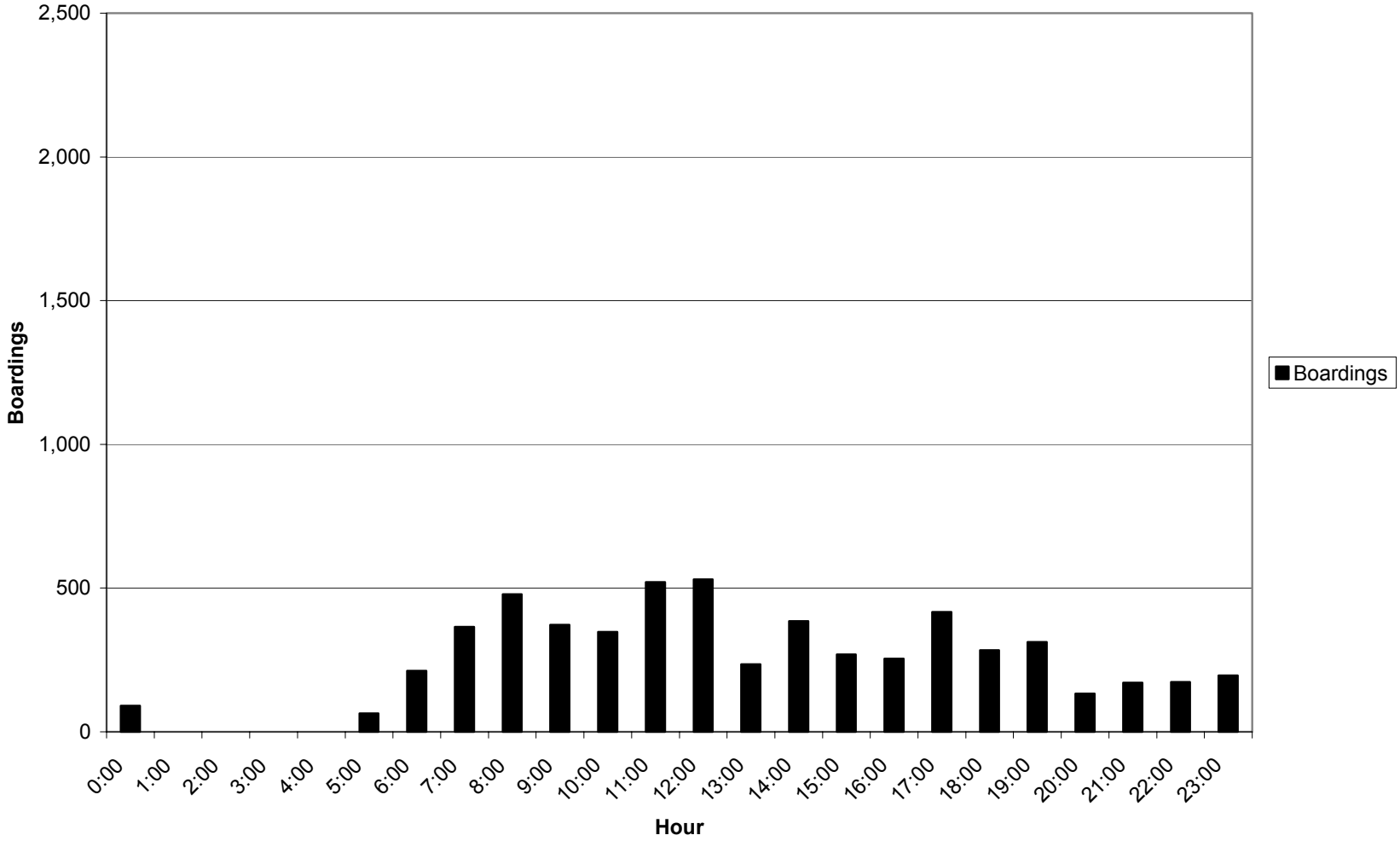


Figure 6-7: Queens Surface Saturday Local Route Boardings By Hour

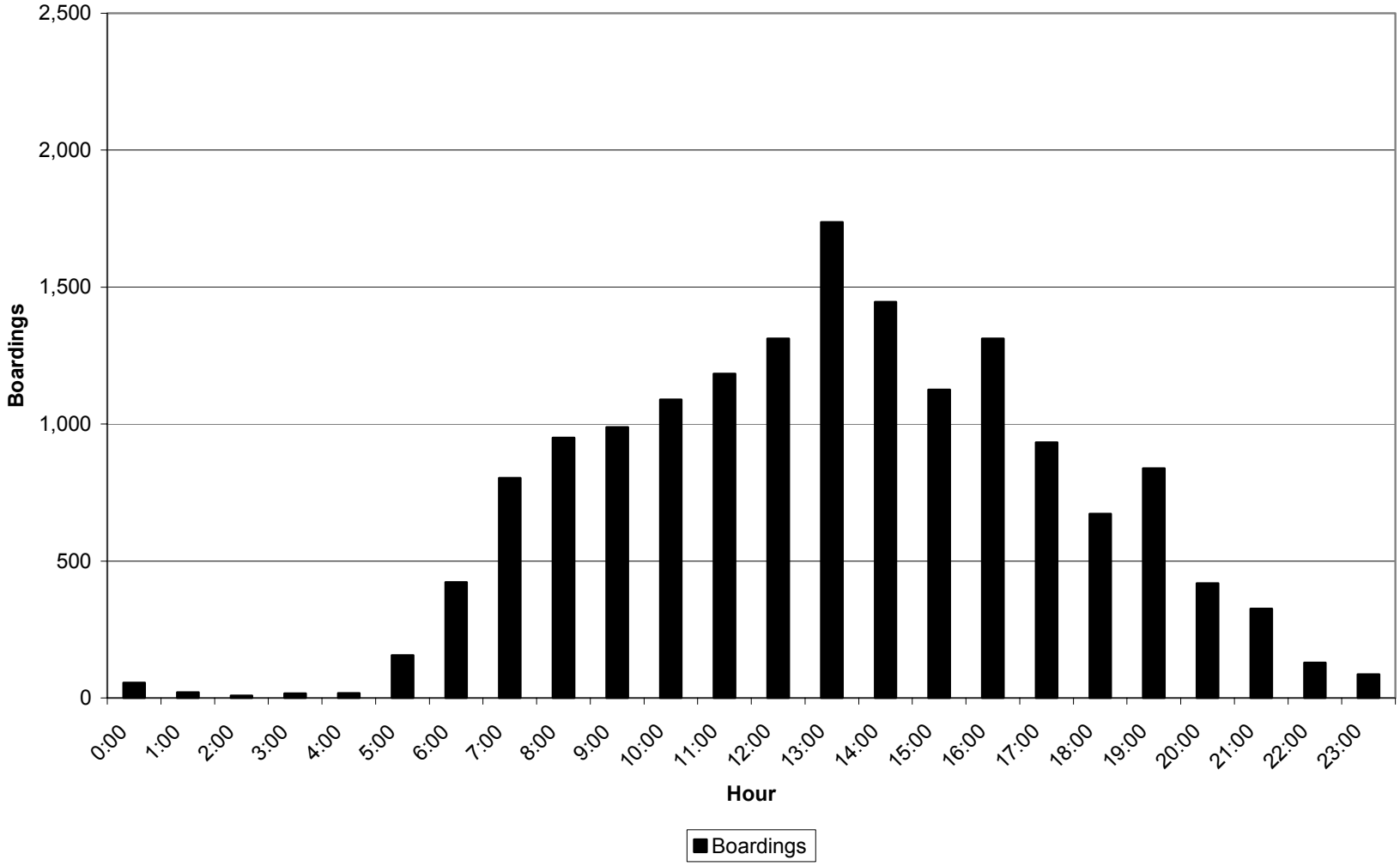


Figure 6-8: Triboro Coach Saturday Local Rout Boardings By Hour

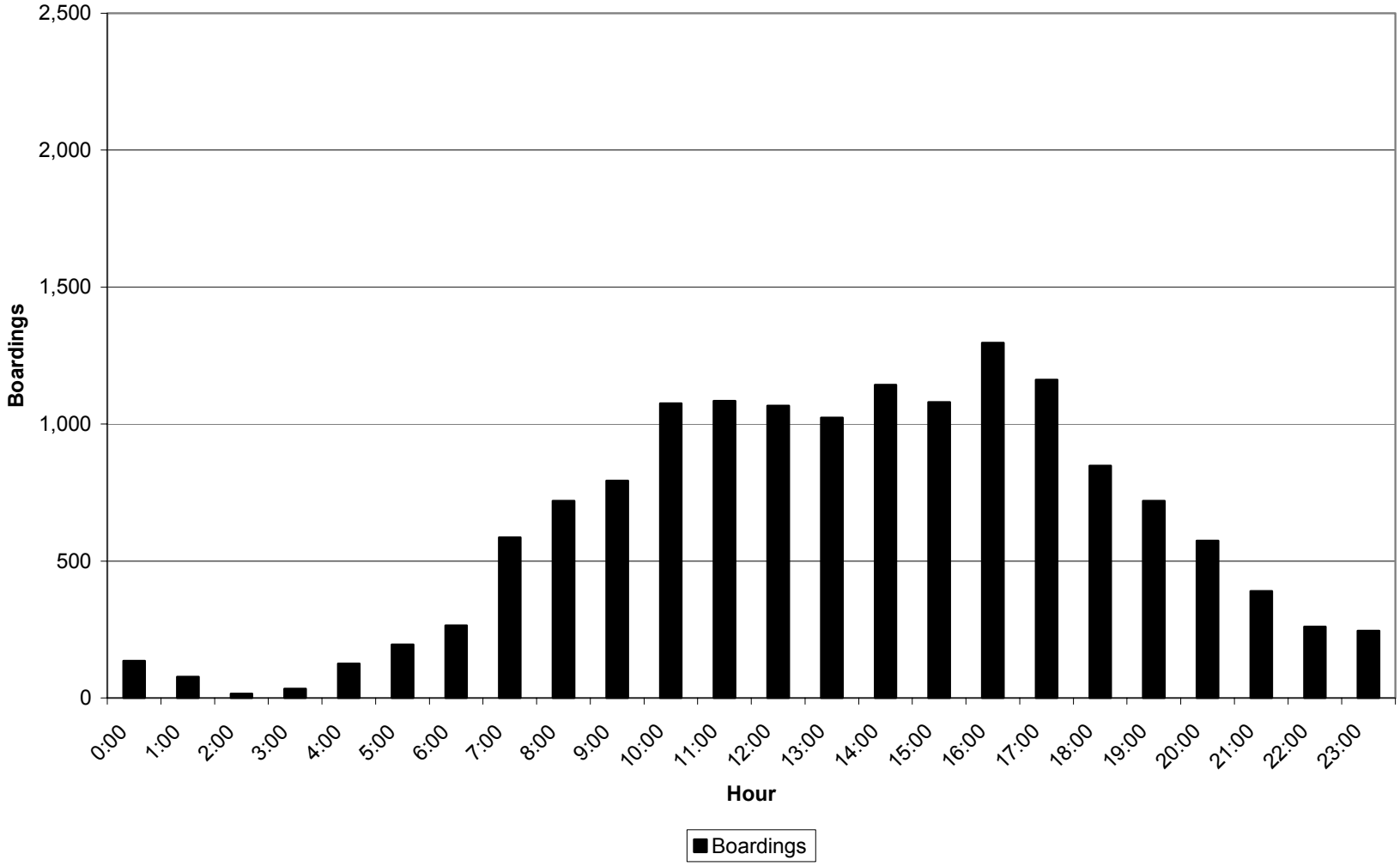


Figure 6-9: Green Bus Lines Sunday Local Route Boardings By Hour

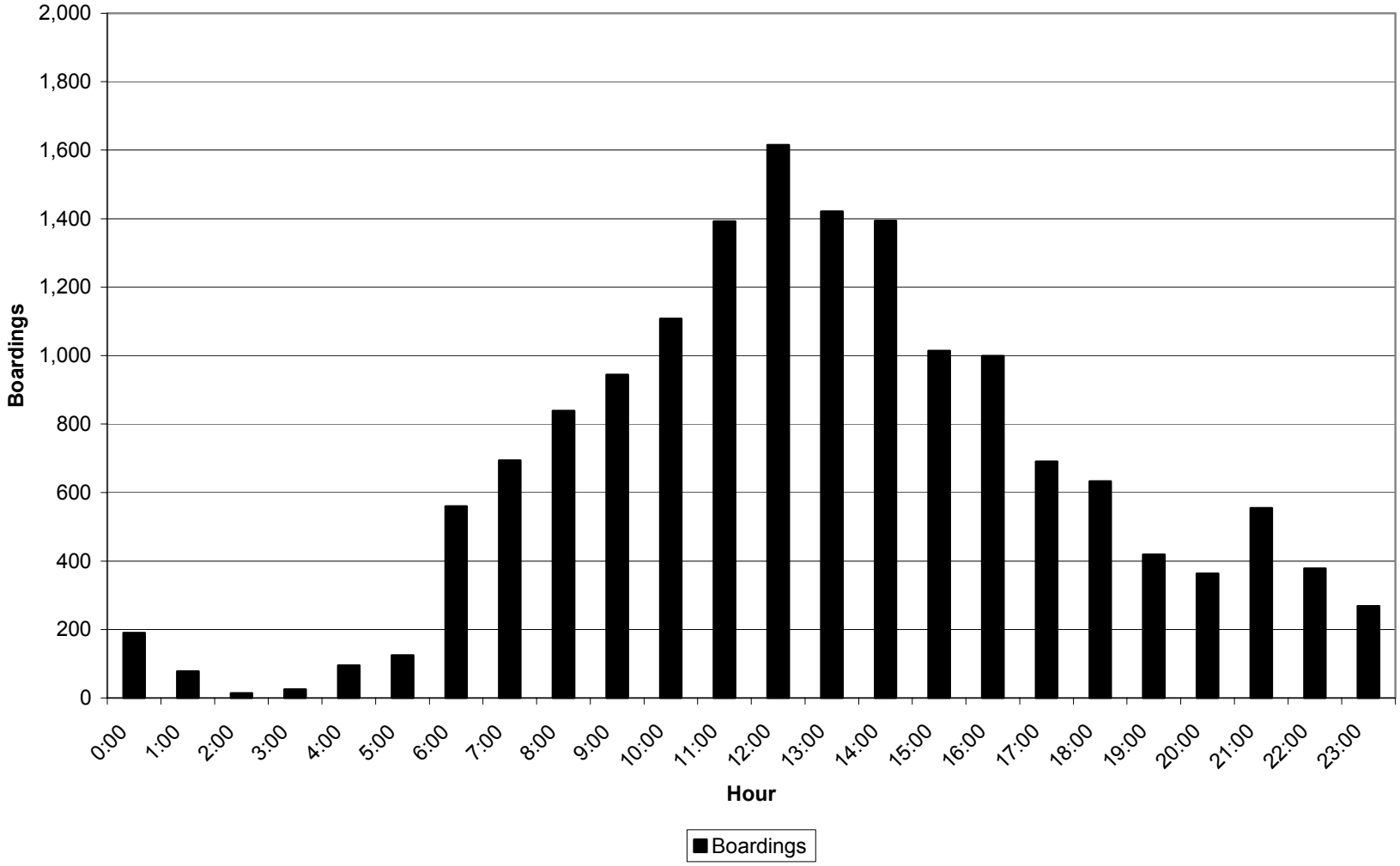


Figure 6-10: Jamaica Buses Sunday Local Route Boardings By Hour

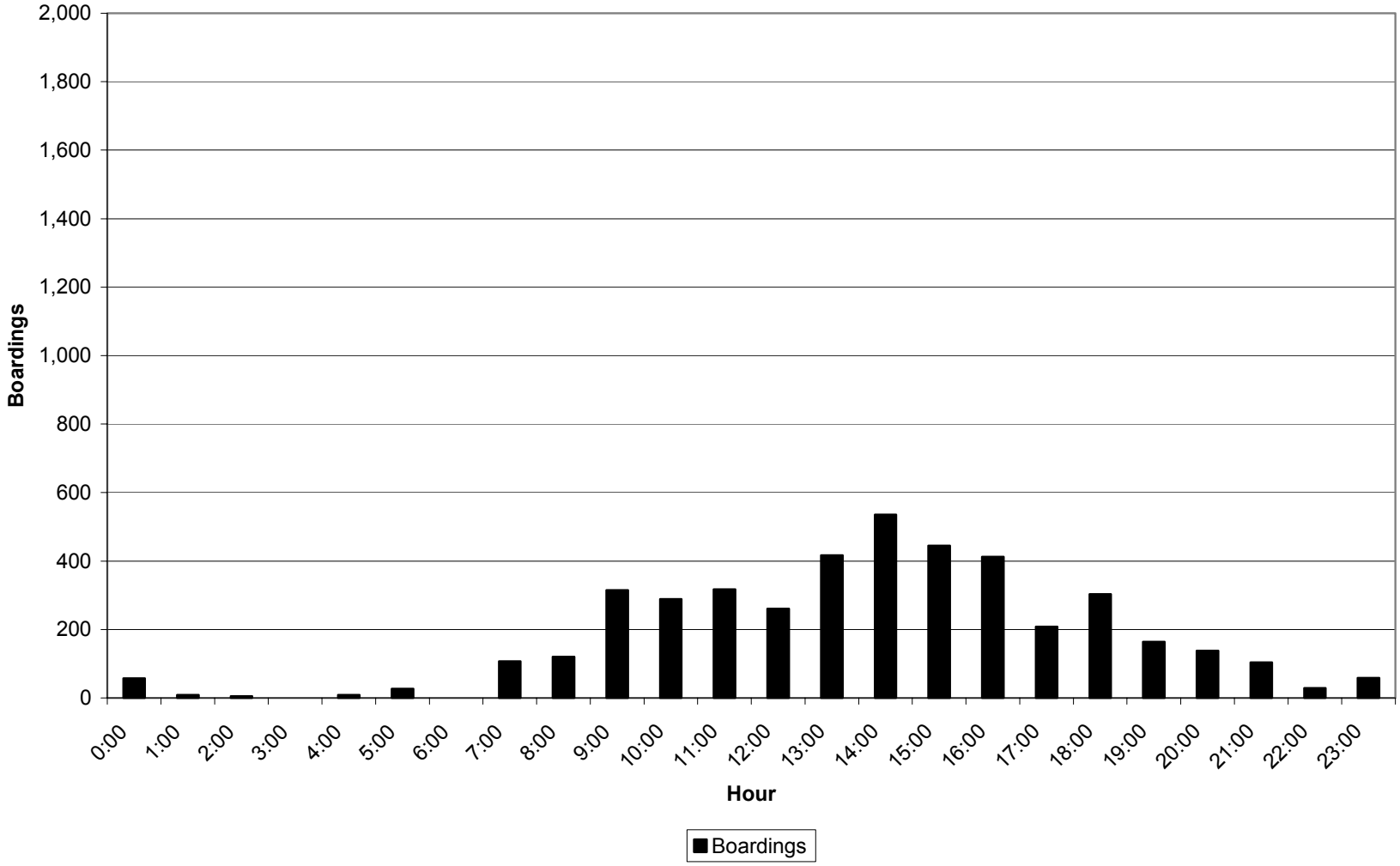


Figure 6-11: Queens Surface Sunday Local Route Boardings By Hour

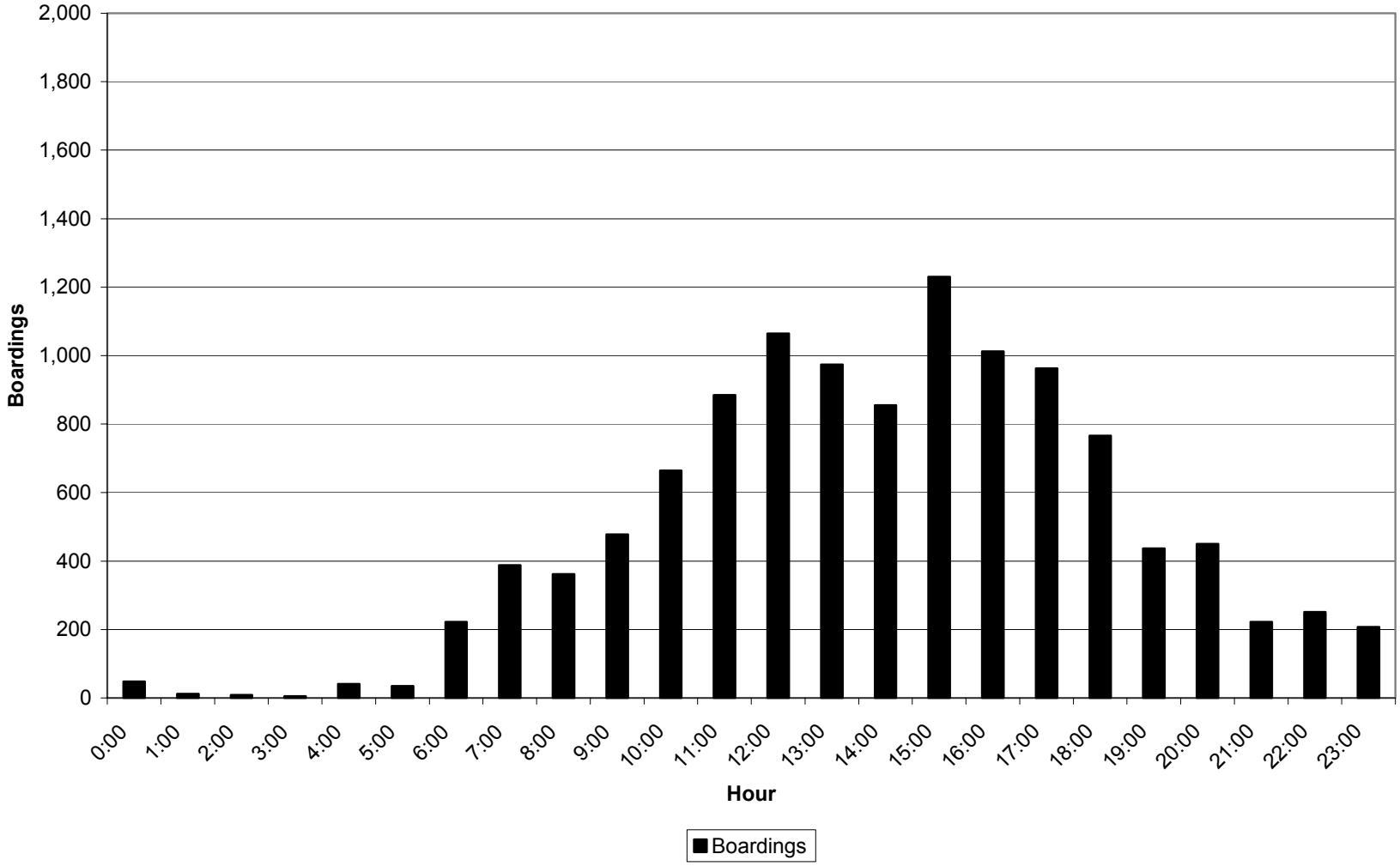


Figure 6-12: Triboro Coach Sunday Local Route Boardings By Hour

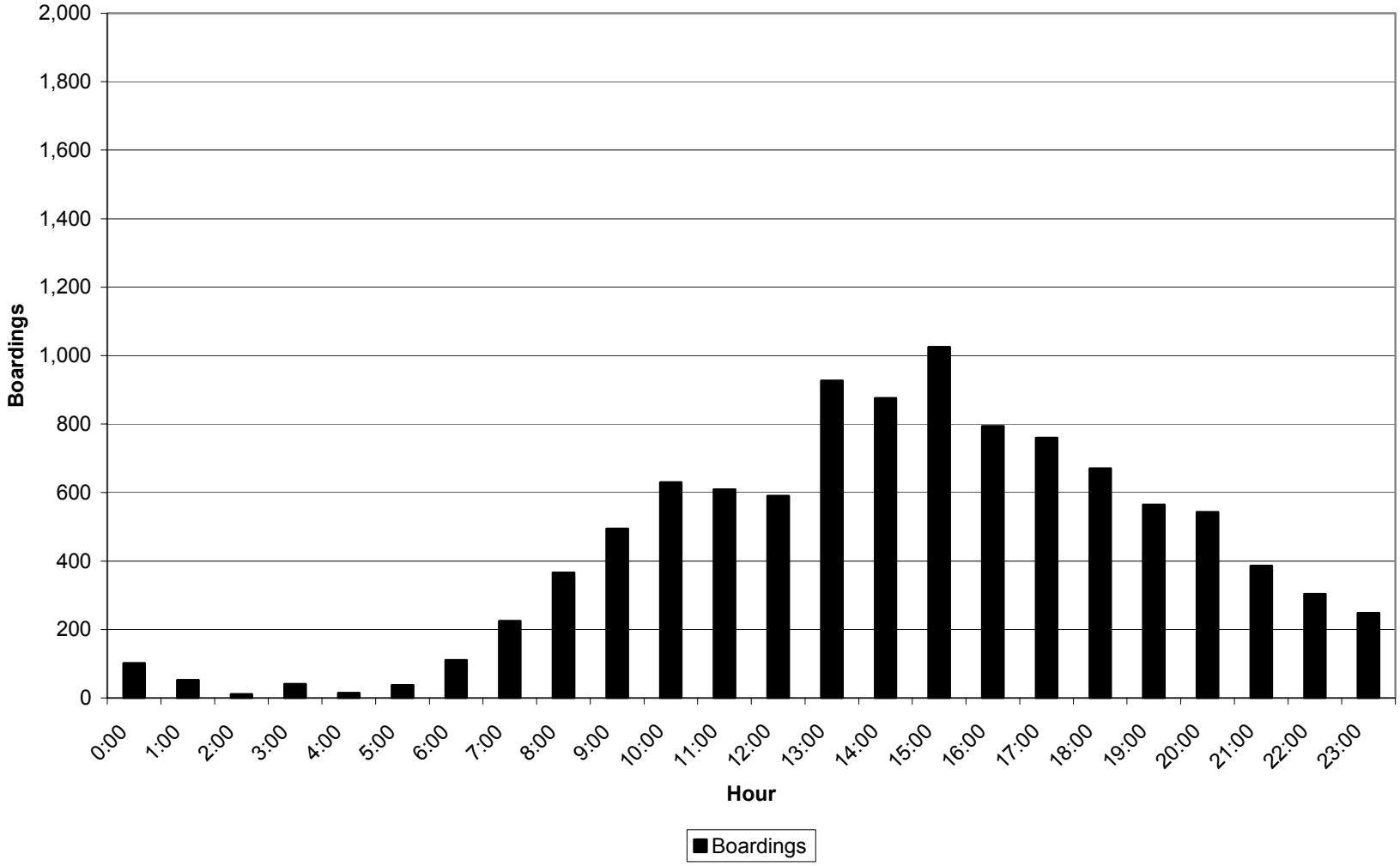


Table 6-2: Bus Stops with the Most Passenger Activity

Stop Location	NYCDOT Routes Served	Transfer Opportunities	On*	Off*	Total*
Suthpin Boulevard and Archer Avenue	Q6, Q8, Q9, Q40, Q41, Q60	Subway E/J/Z, LIRR, Q20A, Q20B, Q24, Q30, Q31, Q43, Q44	1,486	3,943	5,429
Main Street and Roosevelt Avenue	Q25, Q34, Q65, Q66, QBx1	Subway #7, LIRR, N20, N21, Q12, Q13, Q14, Q15, Q16, Q17, Q20A, Q20B, Q27, Q28, Q44, Q48, Q58, X32	2,414	1,696	4,110
Archer Avenue and Parsons Boulevard	Q6, Q8, Q9, Q41, Q111, Q112, Q113	Subway E/J/Z, N4, Q4, Q5, Q20A, Q20B, Q24, Q30, Q31, Q42, Q44, Q83, Q84, Q85	1,602	2,137	3,739
Woodhaven Boulevard and Queens Boulevard	Q11, Q29, Q38, Q53, Q60	Subway G/R/V, Q59, Q88, QM10, QM11, QM18	1,605	1,612	3,217
Pelham Bay Park Subway Station (Bronx)	QBx1	Subway #6, Bx5, Bx12, Bx14, Bx29, BxM7A, Westchester Bee Line #45	1,449	1,737	3,186

*** Based on trips sampled only, NYCDOT routes only**

Loading Analysis

NYCDOT has set loading guidelines for both local and express buses. The guideline is represented as a ratio of passengers to the number of seats on a bus. A 100% load factor would refer to a situation where the number of on-board passengers equals the seating capacity of a bus. The peak hour load factor is 140% and is relevant to time periods on weekdays from 6:00 AM until 10:00 AM and from 3:00 PM until 7:00 PM. During all other times, the load factor is 120% for local bus services. Assuming a 43-seat bus, the acceptable number of passengers during peak periods is 63 passengers per vehicle, while during off-peak periods, the acceptable number of passengers is 52 passengers per vehicle. Triboro Coach and Queens Surface have fleets that include CNG vehicles, which accommodate only 55 passengers and therefore have lower thresholds for exceeding NYCDOT-defined load factors. Maximum load data for each route is presented as part of the route profiles in appendix B.

NYCDOT bus planning guidelines state that if 50% or more trips in a given hour exceed the maximum loading guideline, service should be added to the given route. Table 6-3 shows the number and percent of trips per route that exceed the loading guideline based on the data that was collected. It should be noted that the random sample probably did not include all trips on which load factors are often exceeded. However, it would be worthwhile to perform load checks of non-sampled trips on routes where load factors were exceeded on other trips. The routes that have 25% or

more trips that exceed this guideline are the Q6 on both weekdays and Saturdays, Q10 on Saturdays, Q11 on Saturdays, Q60 on Saturdays, and the Q65 on weekdays. It should be noted that weekdays have more trips that exceed the loading guideline than weekends.

Table 6-3: Overcrowding on Local Sampled Trips

Route	Overcrowded Trips			Percent Overcrowded		
	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday
Green Bus Lines						
Q6	21	15	3	29%	25%	9%
Q7	8	1	1	14%	2%	3%
Q8	10	5	0	14%	10%	0%
Q9	12	5	0	16%	9%	0%
Q9A	0	0	0	0%	0%	0%
Q10	23	15	5	20%	25%	16%
Q11	22	20	7	21%	34%	19%
Q21	1	0	0	3%	0%	0%
Q22	7	0	0	8%	0%	0%
Q35	1	1	0	1%	2%	0%
Q37	11	0	0	13%	0%	0%
Q40	18	10	0	16%	13%	0%
Q41	12	2	0	19%	5%	0%
Q60	6	6	1	8%	25%	5%
Jamaica Buses						
Q110	5	0	0	4%	0%	0%
Q111	19	2	1	15%	7%	5%
Q112	4	0	0	3%	0%	0%
Q113	13	5	2	20%	16%	6%
Queens Surface						
Q25	10	5	3	20%	16%	7%
Q34	5	0	0	18%	0%	0%
Q65	19	2	1	26%	6%	4%
Q65A	16	1	0	9%	1%	0%
Q66	14	5	0	17%	11%	0%
Q67	1	0	0	1%	0%	0%
QBx1	7	0	0	6%	0%	0%
Q101	3	0	0	3%	0%	0%
Q101R	5	5	5	13%	20%	11%
Q102	2	0	0	2%	0%	0%
Q103	0	0	0	0%	0%	0%
Q104	3	0	0	4%	0%	0%
Triboro Coach						
Q18	7	0	0	11%	0%	0%
Q19	0	0	0	0%	0%	0%
Q19A	10	0	0	10%	0%	0%
Q19B	19	2	1	17%	3%	2%
Q23	9	0	0	20%	0%	0%
Q29	10	0	0	10%	0%	0%
Q33	5	1	2	6%	2%	5%
Q38	2	0	0	4%	0%	0%
Q39	4	0	0	6%	0%	0%
Q45	5	0	0	4%	0%	0%
Q47	4	0	0	4%	0%	0%
Q53	0	0	0	0%	0%	0%
Q72	14	2	0	13%	5%	0%

6.2 Express Ridership

The survey for express buses consisted of load checks rather than on-off counts. Surveyors were positioned at the last inbound stop of each express route in Queens or the Bronx. Due to the nature of express bus service, this stop corresponds to the maximum load point. Surveyors boarded each scheduled bus and performed a manual count of passengers on-board, including those that boarded at the final stop. They also noted bus departure times. In a few cases, loads at intermediate points were checked to determine whether overloading occurs before the maximum load stop. Only inbound trips operating to Manhattan were checked, but 100% of these trips were surveyed. Appendix E provides an example of the load check form that was developed and utilized by surveyors, as well as load check results by trip and location.

Individual Route Ridership

Table 6-4 provides an overview of ridership estimated for each route on weekdays, Saturdays, and Sundays. Ridership for each route is highest on weekdays and lowest on Sundays. Many of the express routes operate only on weekdays, and some of the routes only provide a small number of trips that operate only during peak periods. Ridership is based on inbound ridership figures collected on all inbound trips as part of the project, and estimated for outbound trips based on data a directional split that comes from company observed outbound versus inbound volumes.

The highest estimated ridership is on the QM1/QM1A combination on weekdays. Other routes that have very high ridership include the BxM1, BxM7, BxM9, BxM10, QM2/2A, and QM24. These are the routes that have the most frequent service, most also provide midday and weekend service. Routes that have low ridership are the routes that operate a small number of trips, operating peak periods only.

Table 6-4: Estimated Average Daily Express Ridership

Company	Route	Weekday	Saturday	Sunday
Green Bus Lines	QM15	848	46	No Service
	QM16	57	No Service	No Service
	QM17	178	No Service	No Service
	QM18	315	No Service	No Service
	QM23	52	No Service	No Service
Jamaica Buses	QM21	581	No Service	No Service
Liberty Lines	BxM1	2,199	1,177	660
	BxM2	1,149	1,177	677
	BxM3	1,241	507	375
	BxM4 A/B	857	259	132
	BxM11	1,879	1,153	549
	BxM18	237	No Service	No Service
New York Bus Service	BxM6	796	728	312
	BxM7	3,593	2,090	1,166
	BxM7A	1,823	842	411
	BxM7B	96	No Service	No Service
	BxM9	2,026	900	385
	BxM10	2,024	1,127	618
Queens Surface	QM1/1A	9,262	738	302
	QM2/2A	2,406	429	324
	QM3	153	No Service	No Service
	QM4	1,338	261	188
Triboro Coach	QM10	794	No Service	No Service
	QM11	463	No Service	No Service
	QM12	881	No Service	No Service
	QM22	92	No Service	No Service
	QM24	1,984	No Service	No Service

Ridership by time of Day

Express bus ridership is heaviest during peak periods, traveling in the peak direction on weekdays, since express bus routes primarily connect residential locations in the outer boroughs to work destinations in Midtown and Lower Manhattan. Ridership by time of day is shown in Appendix E for express routes.

Loading Analysis

The NYCDOT loading guideline for express buses is 100%, which means that the number of passengers on board should not exceed the number of seats provided. A

majority of buses in the express bus fleet are 53 seat vehicles, however it is expected that future express buses will have 46 seats. The ridership check for express buses consisted of counts at the last stop before buses go express to Manhattan, in the inbound direction only, which is the maximum load point. Based on these counts, there is very little overcrowding on express buses.

NYCDOT bus planning guidelines state that if 50% or more trips in a given hour exceed the maximum loading guideline, service should be added to the given route. Table 6-5 shows routes that have trips that are overcrowded based on the data that was collected. Bus company personnel noted that ridership on express buses had decreased significantly subsequent to the operators strike that occurred in 2002, causing instances of "crush loads" to decrease. During the analysis phase of this study, it will be important to also identify time periods where service frequency can be justifiably reduced due to low utilization.

Table 6-5: Overcrowded Express Routes

Route	Day	Number of Trips Overcrowded	Percent of Trips Overcrowded
BxM1	Weekday	1	2%
BxM10	Weekday	1	2%
BxM11	Weekday	1	2%
QM1	Weekday	1	2%
QM1A	Weekday	1	1%
QM15	Weekday	1	6%
QM17	Weekday	1	50%
QM18	Weekday	1	11%
QM24	Weekday	3	6%
BxM11	Saturday	1	3%

Chapter 7 Time Point Analysis

7.1 On-Time Performance

As part of the ridecheck collection, surveyors recorded the time of departure from the major timepoints for each of the local routes, and arrival time at the route endpoint. This data is useful to determine on-time performance of a bus route. For express buses, surveyors recorded the time that the bus departed the location being surveyed, whether it was at the last stop before going to Manhattan, or an intermediate stop. For a trip to be considered early, it needs to depart no more than two minutes prior to the scheduled departure time and no more than five minutes late. Table 7-1 displays the percent of trips sampled that were on-time for all timepoints for each local route. Table 7-2 shows the on-time performance for the inbound express bus trips. Information for each local route by time-point is presented Appendix F.

In general, on-time performance tends to be better on Sundays, while it is the worst during weekdays. This is most likely because the highest volume of service is provided on weekdays and the effects of traffic congestion are the worst. While on Sundays, the lowest volume of service is provided, and congestion is not as much of an issue. Some of the routes that are of concern since they operate on-time less than 30% of the time include the Q53 in both directions on Saturdays as well as the northbound direction on weekdays, the Q6 in the northbound direction on weekdays, the Q9A in the westbound direction on weekdays, the Q18 in the eastbound direction on weekdays, the Q19A in the northbound direction on Saturdays, the Q38 in the southbound direction on Sundays, and the Q60 in the westbound direction on weekdays.

Express bus services, just like local bus service, have better on-time performance on weekends versus weekdays. Some of the routes that have a very small percentage (less than 35%) of trips that operate on-time include the QM18, BxM4, and QM4 on weekdays, and the BxM3 and BxM11 on Saturdays.

Many factors may contribute to poor on-time performance, including local traffic conditions, lack of adequate street supervision, and schedules that do not reflect actual running time. Current schedules, especially ones that have not been updated recently, might not reflect the traffic conditions for certain routes during certain parts of the day. In cases where routes run very frequent service, a trailing bus might pass its leader, causing the driver to use discretion to maintain proper vehicle spacing regardless of the schedule, which may be appropriate from a customer service standpoint. Also, high volumes of ridership could impact on-time performance since crowded buses make more stops and dwell at those stops for a longer period of time. In the next stage of analysis, routes with poor on-time performance will be investigated further to determine potential improvement measures.

Table 7-1: Local Route On-Time Performance

Company	Route	Direction	Percent On-Time		
			Weekday	Saturday	Sunday
Green Bus Lines	Q6	Northbound	27.8%	82.8%	68.8%
		Southbound	41.7%	74.2%	88.2%
	Q7	Eastbound	66.7%	80.8%	89.5%
		Westbound	74.2%	83.3%	88.9%
	Q8	Eastbound	57.5%	84.6%	75.0%
		Westbound	54.5%	83.3%	64.7%
	Q9	Northbound	69.0%	88.9%	84.2%
		Southbound	67.6%	92.3%	94.4%
	Q9A	Eastbound	40.0%	NA	NA
		Westbound	20.0%	NA	NA
	Q10	Northbound	68.5%	66.7%	81.3%
		Southbound	63.9%	48.4%	73.3%
	Q11	Northbound	71.2%	79.3%	72.2%
		Southbound	75.5%	76.7%	83.3%
	Q21	Northbound	75.0%	46.2%	92.3%
		Southbound	88.9%	46.2%	92.3%
	Q22	Eastbound	66.7%	66.7%	65.2%
		Westbound	57.8%	76.7%	69.6%
	Q35	Eastbound	62.5%	47.6%	58.6%
		Westbound	70.2%	61.9%	72.4%
	Q37	Northbound	67.4%	76.2%	100.0%
		Southbound	68.3%	90.5%	87.5%
	Q40	Northbound	74.1%	85.0%	87.1%
		Southbound	80.0%	84.2%	93.5%
	Q41	Northbound	50.0%	71.4%	62.5%
		Southbound	63.3%	61.9%	66.7%
	Q60	Eastbound	48.6%	58.3%	60.0%
		Westbound	29.4%	58.3%	40.0%
Jamaica Buses	Q110	Eastbound	72.1%	79.3%	62.5%
		Westbound	74.0%	81.5%	66.7%
	Q111	Northbound	56.3%	60.0%	30.0%
		Southbound	60.9%	69.2%	50.0%
	Q112	Eastbound	31.4%	48.6%	42.9%
		Westbound	34.8%	60.0%	53.3%
	Q113	Northbound	47.1%	66.7%	37.5%
		Southbound	46.7%	62.5%	41.2%
Queens Surface	Q25	Northbound	56.7%	66.7%	81.0%
		Southbound	57.1%	31.3%	65.0%
	Q34	Northbound	46.2%	NA	NA
		Southbound	73.3%	NA	NA
	Q65	Northbound	48.6%	61.1%	76.9%
		Southbound	61.5%	44.4%	86.7%

Table 7-1: Local Route On-Time Performance (Cont.)

Company	Route	Direction	Percent On-Time		
			Weekday	Saturday	Sunday
Queens Surface (cont.)	Q65A	Eastbound	60.4%	86.2%	75.0%
		Westbound	74.2%	91.5%	58.3%
	Q66	Eastbound	52.4%	82.6%	63.2%
		Westbound	64.3%	60.9%	63.2%
	Q67	Eastbound	46.2%	100.0%	100.0%
		Westbound	37.7%	92.9%	100.0%
	QBx1	Northbound	81.2%	68.0%	66.7%
		Southbound	82.7%	52.9%	66.7%
	Q101	Northbound	47.7%	72.7%	61.1%
		Southbound	42.2%	63.6%	83.3%
	Q101R	All	38.5%	100.0%	97.8%
	Q102	Northbound	60.4%	74.2%	79.2%
		Southbound	59.1%	80.0%	78.3%
	Q103	Northbound	94.4%	NA	NA
		Southbound	88.9%	NA	NA
	Q104	Northbound	66.7%	75.0%	85.2%
		Southbound	74.4%	70.4%	77.8%
Triboro Coach	Q18	Eastbound	24.2%	40.0%	58.3%
		Westbound	53.1%	40.0%	72.7%
	Q19	Eastbound	88.9%	85.7%	85.7%
		Westbound	57.9%	100.0%	85.7%
	Q19A	Northbound	44.9%	25.0%	44.4%
		Southbound	60.4%	50.0%	44.4%
	Q19B	Eastbound	63.0%	51.5%	53.8%
		Westbound	77.2%	76.5%	70.8%
	Q23	Northbound	37.5%	76.9%	58.3%
		Southbound	40.9%	61.5%	81.8%
	Q29	Northbound	70.4%	69.2%	61.9%
		Southbound	52.1%	60.0%	45.0%
	Q33	Northbound	65.9%	69.0%	31.6%
		Southbound	55.3%	67.9%	33.3%
	Q38	Northbound	48.1%	42.9%	46.7%
		Southbound	50.0%	33.3%	28.6%
	Q39	Eastbound	69.4%	71.4%	81.3%
		Westbound	48.6%	73.3%	53.3%
	Q45	Northbound	71.8%	78.1%	91.3%
		Southbound	73.2%	93.9%	95.8%
	Q47	Northbound	64.4%	53.1%	58.3%
		Southbound	79.6%	61.8%	62.5%
	Q53	Northbound	22.2%	25.0%	40.0%
		Southbound	45.5%	18.2%	40.0%
	Q72	Northbound	38.5%	45.5%	70.8%
		Southbound	42.6%	30.0%	70.8%

Table 7-2: Express Route On-Time Performance

Company	Route	Percent On-Time		
		Weekday	Saturday	Sunday
Green Bus Lines	QM15	82%	0%	No Service
	QM16	100%	No Service	
	QM17	50%		
	QM18	33%		
	QM23	100%		
Jamaica Buses	QM21	85%	No Service	
Liberty Lines	BxM1*	78%	44%	63%
	BxM2	67%	55%	61%
	BxM3	75%	35%	86%
	BxM4	31%	63%	93%
	BxM11	78%	32%	53%
	BxM18	60%	No Service	
New York Bus Service	BxM6	73%	59%	67%
	BxM7	92%	73%	89%
	BxM7A	38%	62%	55%
	BxM7B	100%	No Service	
	BxM9	55%	50%	73%
	BxM10	68%	78%	91%
Queens Surface	QM1*	82%	No Service	
	QM1A*	73%	50%	64%
	QM2	81%	40%	40%
	QM2A	97%	No Service	
	QM3	100%		
	QM4	31%	87%	80%
Triboro Coach	QM10	74%	No Service	
	QM11	57%		
	QM12	39%		
	QM22	100%		
	QM24*	74%		

***Routes surveyed at more than one location**

7.2 Running Time Analysis

In addition to on-time performance analysis the ridcheck data collection effort yielded useful data for actual running times to be calculated for all the local routes analyzed in this study.

Appendix G displays scheduled and actual running times for the various route segments pertaining to all local routes. Route segments are classified by direction (EB, WB, NB, SB), day of the week (weekday, Saturday, Sunday), and time period (AM Peak, midday, PM peak, evening/overnight, weekend day, weekend night). In addition segments are grouped by common start/end points.

Express bus data is not presented as surveyors who conducted the ridechecks only collected data when the bus left their respective locations. This location was usually the *last* location before the express bus traveled to Manhattan and the last location where passengers were picked up. Surveyors were not present on respective express buses but instead were placed at locations where the route traveled express to Manhattan.

Table 7-3, displayed on the following pages, presents route segments that significantly deviate from their scheduled route times.

Table 7-3: Routes that Deviate from Scheduled Running Time by 10 Minutes or More

Route	Direction	Day	Start Point	End Point	Time Period	Scheduled Running Time	Actual Running Time
Green Bus Lines							
Q6	SB	Wk	137 Ave & Brewer	88 Ave & Parsons	Midday	0:19	0:31
Q7	EB	Wk	Pitkin &Euclid	Rockaway & 150 St	AM Peak	0:26	0:42
Q60	WB	Sat	157 St & 109 Ave	2 Ave & E 60 St	Day	1:10	1:24
Jamaica Buses							
Q111	NB	Wk	137 Ave & Brewer	88 Ave & Parsons	Midday	0:19	0:31
Q112	EB	Wk	98 St & Rockaway	88 Ave & Parsons	AM Peak	0:24	0:34
Q113	SB	Wk	88 Ave & Parsons	Seagirt & Beach 20 S	Evening/Overnight	0:57	1:07
Queens Surface							
Q25	NB	Wk	160 St & Jamaica	119 St & Poppenhusen	Midday	0:52	1:10
Q25	SB	Wk	119 St & Poppenhusen	160 St & Jamaica	AM Peak	0:48	0:58
Q25	SB	Wk	Main St & Roosevelt	Kissena & Jewel	PM Peak	0:15	0:28
Q65	SB	Sat	110 St & 14 Ave	160 St & Jamaica	Day	1:03	0:51

Table 7-3: Routes that Deviate from Scheduled Running Time by 10 Minutes or More (Cont.)

Route	Direction	Day	Start Point	End Point	Time Period	Scheduled Running Time	Actual Running Time
Queens Surface(Cont.)							
Q101	NB	Sat	E 59 St & 2 Ave	Hazen & 19 Ave	Night	0:27	0:45
Q101R	All	Wk	Rikers Island	Rikers Island	AM Peak	0:45	0:56
Q103	NB	Wk	Vernon & Borden	27 Ave & 4 St	PM Peak	0:16	0:28
Triboro Coach							
Q18	EB	Wk	30 Ave & 8 St	69 St & Grand	PM Peak	0:40	0:56
Q23	NB	Wk	Union Turnpike & Crescent Apts.	Ditmars & 102 St	Midday	0:47	0:57
Q38	NB	Wk	108 St & 63 Dr	Otis & Horace Harding	PM Peak	0:45	0:56
Q38	NB	Sun	108 St & 63 Dr	Otis & Horace Harding	Day	0:35	0:50
Q72	NB	Wk	Queens Blvd &Junction	Ditmars & 94 St	PM Peak	0:25	0:35

Chapter 8 Preliminary Issues

This chapter provides a list of issues raised as a result of the data analyzed in the previous chapters. Issues are presented for the network as a whole, as well as for each individual company. Issues related to specific routes will be taken up in the next phase of the study.

All Carriers

- Fleet Age – 52% of the fleet is over 12 years old
- Vehicle miles increases have not kept up with the pace of ridership increases.
- Many senior citizens are paying their fare with cash, and not taking advantage of Metrocard.
- Poor on-time performance

Green Bus Lines

- Fleet Age – 60% of the fleet is over 12 years old
- Bus Spares Ratio – Low, only at 17%
- Slight loss in vehicle miles, while ridership has increased by 42%.

Jamaica Buses

- Fleet Age – 65% of the fleet is over 12 years old
- Very slight vehicle miles increase, while ridership has increased by 55%.

Liberty Lines

- Fleet Age – The entire fleet is over 12 years old
- Bus Spares Ratio – Very low, at 15%

New York Bus Service

- Fleet Age – 96% of the fleet is over 12 years old. 25 buses are nearing 20 years old.
- Bus Spares Ratio – Very low spares ratio, only 14%.

Queens Surface

- Very low percent of expenses attributed to operations.
- Very high percent of expenses attributed to maintenance. This issue is significant since Queens Surface has the youngest fleet of the franchised carriers.

Triboro Coach

- Fleet Age – 45% of the fleet is over 12 years old.
- Facility – The current facility does not have enough room for the current fleet, buses are parking on neighborhood streets.
- Vehicle miles have only increased by 12%, while ridership has increased by 45%.

Section 2

Proposed Service Modifications

TABLE OF CONTENTS

Chapter 1 Introduction

This section describes the various service modifications proposed for the privately operated bus routes in Queens, the Bronx and Manhattan that are franchised and supported by the New York City Department of Transportation (NYCDOT).

There are two types of bus routes franchised by NYCDOT: local bus routes and express bus routes. The local bus routes typically operate wholly within a specific borough, and connect certain commercial corridors or residential neighborhoods with each other as well as with the subway system. The express bus routes provide a premium non-stop service and connect a specific area with either one or both of Manhattan's central business districts (i.e., Midtown or Downtown). The study was directed to all the bus routes operated by Green Bus Lines, Jamaica Buses, Queens Surface Corporation, Triboro Coach, Liberty Lines Express and New York Bus Service. Proposals for Command Bus are being formulated as part of a separate transportation analysis of Brooklyn.

This technical memorandum first reviews the proposed service modifications for the local bus routes, followed by those proposed for the express bus routes. The issue of service standards for both the local and express bus services will be discussed in a separate section.

Chapter 2 Route Analysis and Recommendations

The proposals presented in this report include suggestions to modify existing bus routes as well as suggestions for entirely new bus lines. The recommendations include proposals to relieve overcrowding, improve schedule dependability, extend coverage to major generators, provide more direct linkages between communities and more clearly identify service along corridors and major arterials, eliminate service where no longer necessary, and reduce inconvenience to passengers by providing direct services where many transfers are now made.

The study proposals documented here relied on an extensive data collection effort which included numerous ride checks and point checks of the current bus system. These data were supplemented with 2000 U.S. Census information on the characteristics of the transportation setting, which were presented in Technical Memorandum number 1. Preliminary proposals were discussed with the project team, which all operators where invited to participate and develop a set of route proposals. It is anticipated that further refinement may occur as the plan is discussed and moves toward implementation.

One point worth noting regarding the recommended service plan is that the recommendations are valid regardless of decisions on ownership and operation of the NYCDOT sponsored bus system. In large measure, this reflects the situation that each franchised operator has their own unique service area with little or no duplication of service. Also, the nature of the current problems - such as overcrowding - is related to specific routes and corridors. Remedial actions for these routes should be made independent of other bus lines.

Another issue related to improvements to the bus system are means to expedite bus movements, reduce delays and improve bus speeds. While the current analysis focuses on operational changes to the bus system, proposals related to traffic policies and infrastructure could also be beneficial. This would include bus preferential strategies, parking prohibitions and enhanced enforcement of traffic rules and regulations.

Currently some service decisions have been based on union work rule issues and their implications. Although these are valid concerns that must be addressed, these rules should not dictate transit policy. Another concern that surfaced during the conduct of this study was sufficient space for bus stops and layovers, especially in congested business districts such as Flushing and Jamaica.

Finally, the analysis here, recent events and prospects for the future would suggest the need for more detailed analysis of the Long Island City area. This area will need to respond to a greater level of development as proposed by the New York City Department of City Planning. Further, there is a need to rationalize local bus service, including the Q19A, Q32, Q39, Q60, Q66, Q67, Q101, Q101R,

Q102, Q103 and the B61 bus routes. This involves broader issues than just the franchised carriers' routes, which is beyond the scope of the current endeavor. Notwithstanding the above, the recommendations presented in the technical memorandum are still valid and worthy of implementation. They would be viewed as the first step in the process of improving Long Island City bus service, with further refinements in the future.

2.1 Local Bus Service

General Issues

Route Identification - Presently, there is inconsistency among the various operators as to how local bus routes are named. There is general agreement as to the need to reduce the confusion regarding the various local bus routes and their destinations. It is recognized that selection of a preferred approach to route nomenclature may be controversial. In this analysis, we have described one nomenclature system that would be worthy of consideration. Accordingly, it should be viewed as illustrative, rather than as a specific recommendation. Nonetheless, it provides a means to describe both the existing local routes and proposed changes. This system is as follows:

- The basic bus route will continue to be identified by the alpha-numeric combination familiar to most current users of the system where a letter indicates the borough of operation and is followed by a route number (e.g., Q8).

- Short turns or short route variations of the basic route will also utilize the name of the basic route as long as the short turn point (or points) are located along the same basic route alignment path. These trips will instead be identified on the vehicles' destination signs as serving the short turn point rather than the entire route length. For example, the Q23's current basic northbound route would be indicated on the bus destination signs as "*Q23 - 108th Street - to Ditmars Boulevard/102nd Street*" while the current northbound short turn trips would be indicated as "*Q23 - 108th Street - to 62nd Drive/108th Street*."

- If a bus route has a short turn or some other route variation that serves a location removed from the basic route alignment path, then a letter suffix should be added to that bus route's name. Letter suffixes would start with "A" for the first route variation and move through the alphabet (i.e., "B" for the second variation, "C" for the third, etc.) although the basic primary or "home" bus route would not have a suffix added to its name. For example, the Q110 branch serving the 179th Street Subway Station would be called the Q110A. However, there are two exceptions to this rule:

If a local bus route has a limited stop service variation, then it should have an "LTD" suffix added to the name of the route for those trips that operate as a limited stop bus. For example, the limited stop version of the Q113 should be called the Q113LTD. Limited stop service would stop only at major transfer points or other significant traffic generators.

Finally, if a local bus route has an express service variation, then it should have an "X" suffix added to the name of the route for those trips that operate as an express bus. For example, the express version of the Q10 should be called the Q10X. This nomenclature rule refers only to the express versions of local bus routes and not to the interborough express bus routes that will be discussed in the subsequent section of this report.

Also, certain bus routes that are currently designated with a route number followed by an alphabetical suffix have nothing in common with the primary or "home" bus route (e.g., the Q19A, which is not related to the Q19). These bus routes would be renumbered.

In the recommendations presented in this report, we have followed these nomenclature conventions. They illustrate how this scheme could be applied to existing, modified and proposed local bus routes. As noted above, it is recognized that other schemes could be adopted to simplify and reduce confusion regarding route nomenclature.

Strategies to Address Overcrowding - A recurring problem with the existing bus system is overcrowding. On many bus trips, riders are not provided a comfortable riding experience. The current analysis addresses this situation in one of three ways. The first of the various methods proposed to help alleviate the overcrowded conditions on certain selected bus routes is to simply increase the frequency of service. Another remedial strategy is to provide additional service on a limited stop basis to supplement the basic local service. Both of these options assume continuation of current fleet acquisition policies to operate standard buses that are 40 feet in length.

A third solution is to utilize articulated (i.e., 60 foot) buses, which is a policy pursued by New York City Transit as well as many transit operators in large metropolitan areas. Recognizing the labor-intensive nature of public transportation, it is one way to increase capacity without a corresponding increase in operating costs. Accordingly, the use of articulated buses is included in the route recommendations.

The use of articulated buses may present certain issues and potential barriers that may need to be overcome. For example, the relative length of articulated buses may make them inappropriate for certain smaller residential neighborhood streets. In addition, if articulated buses were to be utilized then bus stops would have to be lengthened to accommodate this type of equipment and the various bus depots and maintenance facilities will need to be revised and upgraded to permit the use of

articulated buses. Because of their increased capacity, articulated buses may increase the amount of dwell time at each bus stop. However, the increased capacity that articulated buses provide on a bus route - when they are operated with the same frequency of service as standard equipment - partially offsets these drawbacks and allows for a greater percentage of a bus route's passengers to enjoy a seated ride.

The proposed service modifications may also call for the use of articulated buses only for a selected portion of the service day. The nature of the NYCDOT franchised system may therefore create some scheduling and fleet utilization issues.

Although articulated buses have some issues that need to be resolved, they provide some very clear benefits and should comprise an element of any recommendations. However, the necessary time for implementation may suggest a two-tiered approach with respect to the recommended plan. One would include a plan based on current bus equipment, with proposals oriented to revised frequency and the addition of limited service. A second approach would rely on articulated buses being placed in service. Because of the necessary lead time for the introduction of a new equipment type, this report presents recommendations for both types of buses.

Route Issues and Recommendations

Green Bus Lines

Q6 Sutphin Boulevard

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q6 experiences overcrowding during the AM and PM weekday peak periods as well as during the afternoon and early evening periods on Saturday.

The Q6 is also a bus route which may be able to more effectively serve certain areas of JFK International Airport, due to its direct approach from the Jamaica area via Sutphin Boulevard and the fact that the areas of the airport it operates nearest to is not directly served by the AirTrain system.

Recommendations - The current AM and PM weekday peak period short turn at the intersection of Sutphin and Rockaway Boulevards would be retained to provide additional capacity along Sutphin Boulevard.

South of the intersection of Sutphin and Rockaway Boulevards, the Q6 would be split into two distinct branches with alternating trips serving one of two terminal points. The Q6 would continue to serve JFK Building 77 (i.e., AMB Cargo Center) at JFK International Airport via Rockaway

Boulevard and North Boundary Road, while the new Q6A would serve the South Cargo Road area at JFK International Airport via 150th Street (i.e., via the current alignment of the Q7 south of Rockaway Boulevard). This modification would allow the Q6 bus route to provide direct service between this portion of JFK International Airport and Jamaica, thereby giving the Q7 bus route the ability to serve other portions of southeastern Queens.

During the AM and PM weekday peak periods, alternating trips along the Q6A branch would operate to the Federal Circle AirTrain Station via the airport's internal roadway system. Depending on ridership during the initial peak period phase, the span of the Federal Circle branch could be expanded. Within JFK International Airport, Cargo Service Road would be utilized to access Federal Circle. This peak period extension of the bus route could be called the Q6C and would provide service between various cargo areas at the airport and the Howard Beach-JFK Airport Subway Station via a connection with the AirTrain system.

Also during the AM and PM weekday peak periods, additional service would be operated along the length of all three proposed variations of this bus route to help alleviate overcrowding along the bus route. Each of the branches would operate about every 10 minutes. Given the additional service provided to the short turn location at the intersection of Sutphin and Rockaway Boulevards, this means that very frequent service would be available along the common portion of the bus route.

Finally, during the afternoon and early evening periods on Saturday, additional service would also be operated along the length of the bus route to help alleviate overcrowding. The Q6 and the Q6A would each operate about every 10 minutes. There would be no Q6C service to the Federal Circle AirTrain Station on weekends.

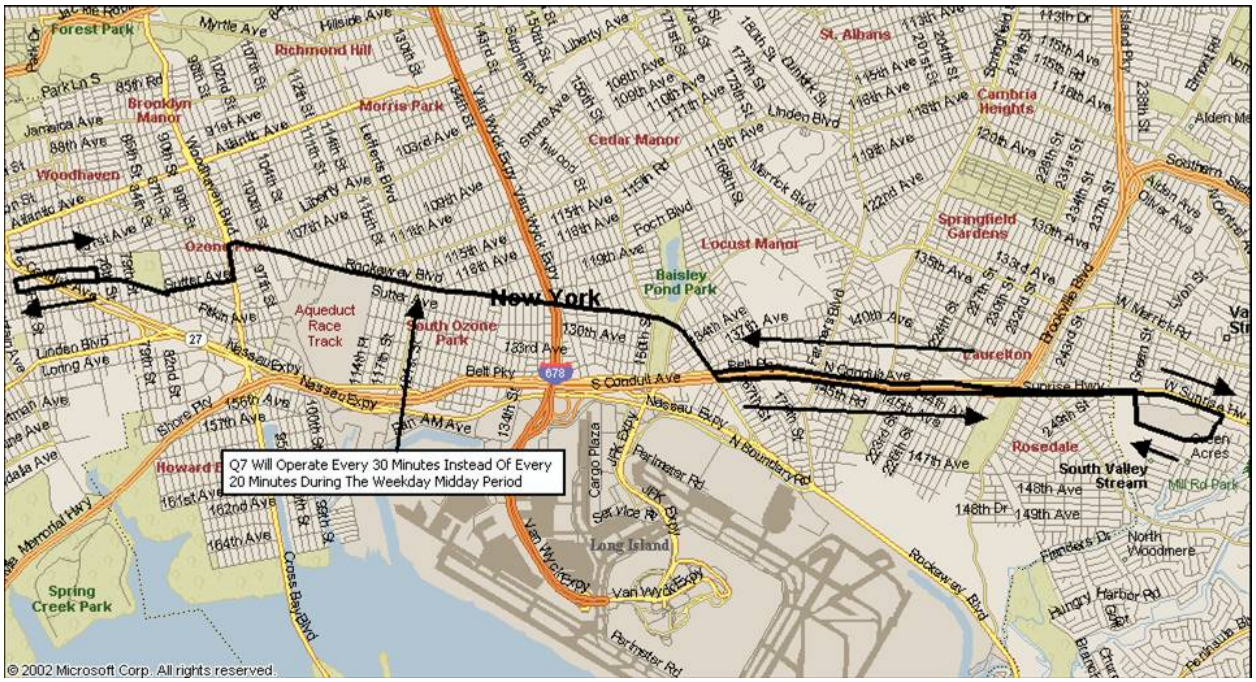
Q7 Rockaway Boulevard

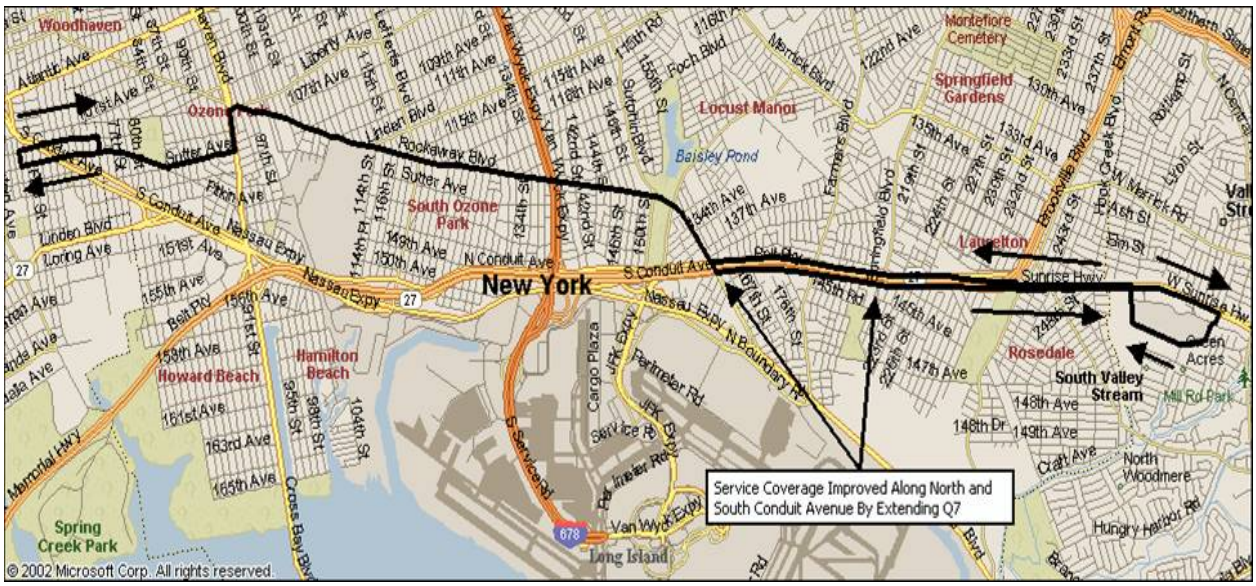
Issues - Ridership to and from JFK International Airport, via 150th Street, on the Q7 is less productive than the Rockaway Boulevard segment of the bus route. However, the Q7 is a bus route that may be able to more effectively serve certain areas of both the Rockaway Boulevard and Conduit Avenue corridors. Utilizing these corridors to connect Ozone Park with the Green Acres Mall in Valley Stream presents an opportunity to create some new public transit connections in this portion of Queens. Service to and from JFK International Airport would still be provided via the proposed modifications to the Q6 bus route.

Recommendations - The current AM and PM weekday peak period short route variation that operates between the Rockaway Boulevard Subway Station and the intersection of Sutphin and Rockaway Boulevards would be retained to provide additional capacity along the most heavily utilized portion of this bus route.

However, the Q7 east of the intersection of Sutphin and Rockaway Boulevards would be restructured to serve the Green Acres Mall in Valley Stream via Rockaway Boulevard and North and South Conduit Avenue approximately every 30 minutes. This modification would allow a new corridor in southeastern Queens (i.e., Conduit Avenue) to receive transit service and would directly connect Ozone Park with the Green Acres Mall in Valley Stream. As previously mentioned service to and from JFK International Airport would now be accommodated via the various branches of the Q6 bus route. Current Q7 passengers who need access to JFK International Airport would now need to transfer to Q6 services at Rockaway Boulevard and Sutphin Boulevard.

Finally, during the weekday midday period, the Q7 would operate every 30 minutes instead of every 20 minutes. Ridership data did not indicate that service every 20 minutes was warranted along the Q7 during this time period.





Q8 101st Avenue

Issues - This bus route, which connects the Euclid Avenue Subway Station with Jamaica in a very direct manner via 101st Avenue, may serve as the basis for creating a one-seat ride between Jamaica and the new Gateway Shopping Center in Brooklyn.

Recommendations - This bus route would be extended via the Euclid Avenue/Crescent Street couplet (i.e., via the current alignment of the B13 bus route) to serve the Gateway Shopping Center in the Spring Creek section of Brooklyn. As previously mentioned, this would provide a one-seat ride between Jamaica and the Gateway Shopping Center. Additionally, it also could allow the B13 bus route to terminate at the Euclid Avenue Subway Station, based on the results of an origin-destination survey.

Q9 Lincoln Street

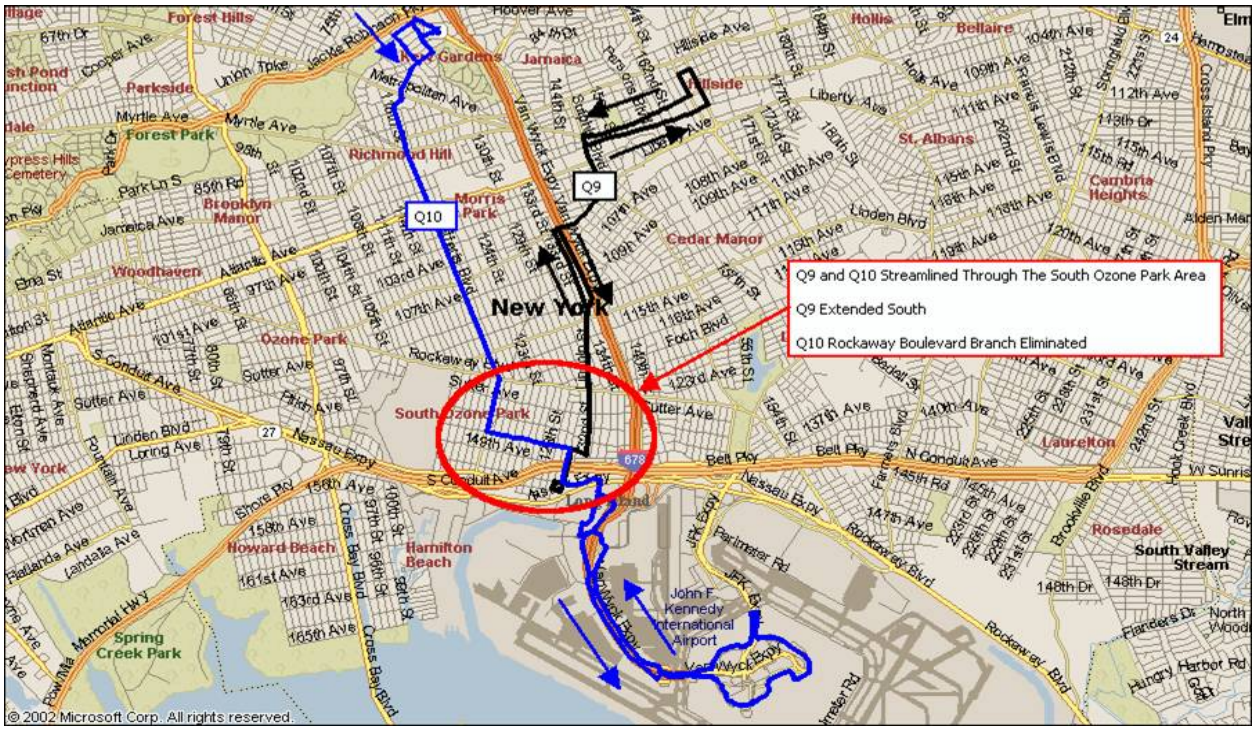
Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q9 experiences overcrowding during the AM weekday peak period as well as during late weekday afternoons and the PM weekday peak period.

The Q9 is also a bus route that may be able to more effectively serve the South Ozone Park community. Opportunities to rationalize some of the transit service in the area with regards to certain segments of the Q10 bus route may be possible.

Recommendations - This bus route would be extended via the current alignment of the Q10's Rockaway Boulevard branch (i.e., via 131st Street) and would serve the Department of Sanitation garage at 130th Street and 150th Avenue, which would also serve as the new southern terminal of the Q9. This modification would both extend the service area of the Q9 through the South Ozone Park area and allow the Q10 bus route to no longer operate an additional branch, thus simplifying that bus route.

During the AM weekday peak period, as well as during late weekday afternoons and the PM

weekday peak period, the Q9 bus route would operate more frequent service to help alleviate overcrowding. Service that operates every 15 minutes would operate approximately every 10 minutes, while service that operates every 5 minutes would operate approximately every 4 minutes. Alternatively, during these time periods this bus route may be a candidate for the use of articulated buses (i.e., 60-foot buses). The articulated buses would operate the same frequency of service as the standard 40-foot buses utilized on the Q9 today, thus alleviating some of the overcrowding on this bus route by virtue of their increased capacity.



Q9A Linden Boulevard

Issues - The Q9A is a relatively poorly performing bus route in terms of passenger productivity. However, opportunities exist to utilize its resources to more effectively serve the Linden Boulevard corridor. Presently, local bus service along Linden Boulevard is disconnected, with two different bus routes serving two disparate segments of the corridor.

Recommendations - The Q9A would be completely restructured. The new local bus route could be named the Q96 and would operate between the Rockaway Boulevard Subway Station and the intersection of Linden Boulevard and 235th Street. To and from the Rockaway Boulevard Subway Station, the route would follow the current alignment path of the Q7 bus as far as Linden Boulevard;

at that point, it would operate to and from its eastern terminus at the intersection of Linden Boulevard and 235th Street. This bus route would provide a one-seat ride along the length of Linden Boulevard. Service would operate every 30 minutes throughout the day all week long from 6:00AM to 12:00AM.

Q10 Lefferts Boulevard

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q10 experiences overcrowding during the AM and PM weekday peak periods as well as during the midday and early evening periods on Saturdays.

The Q10 is also a bus route that may be able to more effectively serve both the South Ozone Park community and JFK International Airport. As was previously mentioned, opportunities to rationalize some of the transit service in the area with regards to both the Q9 and the Q37 bus routes may be possible.

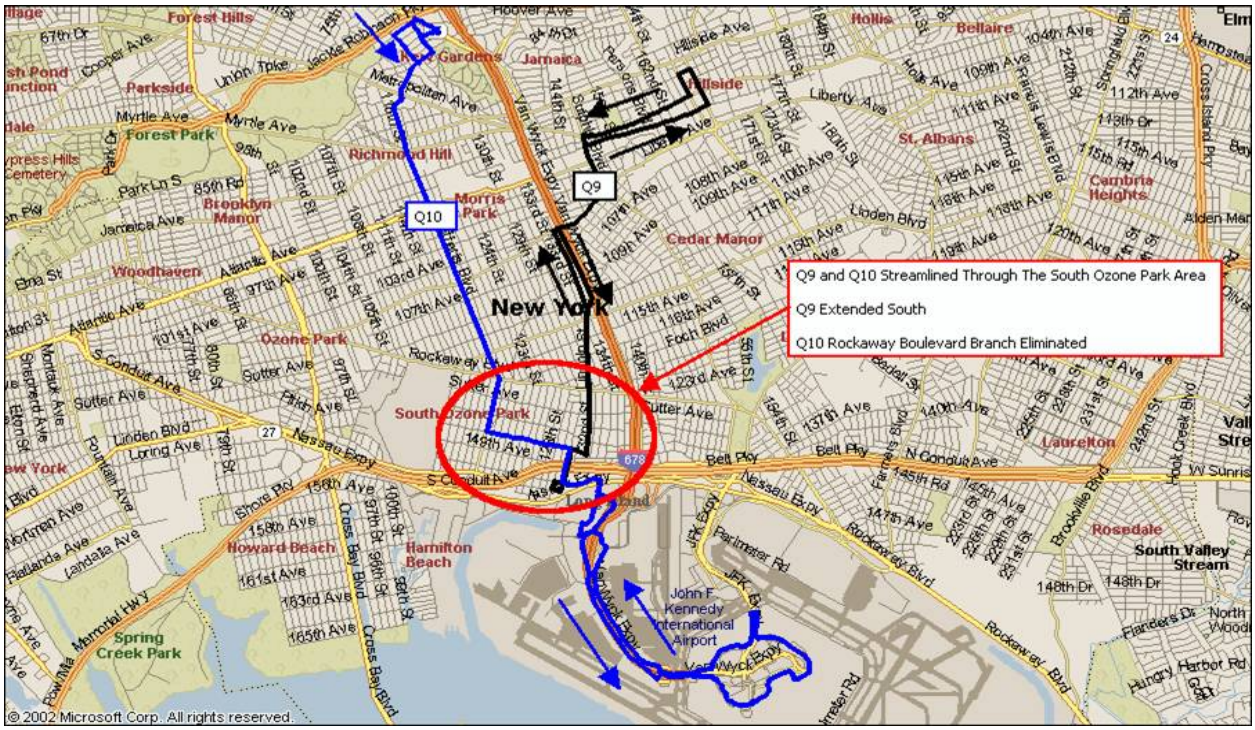
Recommendations - The service via the Rockaway Boulevard branch would be eliminated because the extended Q9 would now provide local bus service through this area. In addition, the service via the Conduit Avenue branch (i.e., all remaining Q10 service) would now operate between Lefferts Boulevard and 130th Street via 135th Avenue (i.e., via the current alignment of the Q37). This modification would streamline the route network in this portion of South Ozone Park by minimizing the walking distance for people in this area to reach the Q10 bus route. The Q10 would no longer operate via Conduit Avenue.

During the AM and PM weekday peak period's additional service would be added approximately every 10 minutes on the short turn route between the Kew Gardens-Union Turnpike Subway Station and the intersection of Rockaway and Lefferts Boulevards to help alleviate overcrowding, above the

current 5 minute service, changing the service from 12 buses per hour to 18. In addition, the trips that operate the entire length of the bus route into the airport during these periods would operate limited stop service north of the short turn point and would be called the Q10LTD. This modification would provide passengers who are riding the entire length of the Q10 bus route with a faster service to and from JFK International Airport.

During the midday and early evening periods on Saturdays, the short turn route between the Kew Gardens-Union Turnpike Subway Station and the intersection of Rockaway and Lefferts Boulevards would now be operated about every 10 minutes to help alleviate some of the overcrowding on this bus route at this time. Once again, the trips that operate the entire length of the bus route into the airport on Saturday afternoons would operate limited stop service north of the short turn point and would be called the Q10LTD.

Finally, on Sunday afternoons this bus route would operate more frequent service to help alleviate overcrowding. Service that operates every 10 minutes would operate approximately every 7.5 minutes (i.e., eight buses per hour rather than six buses per hour). However, during this time period this bus route may be a candidate for the use of articulated buses (i.e., 60 foot buses). The articulated buses would operate the same frequency of service as the standard 40 foot buses utilized on the Q10 today, thus alleviating some of the overcrowding on this bus route by virtue of their increased capacity.



Q10A JFK Airport Limited

Issues - This bus route operates an express service between the Kew Gardens-Union Turnpike Subway Station and JFK International Airport only in the southbound direction and only during the AM weekday peak period. It is utilized to position buses for other Q10 services.

Recommendations - This bus route would be renamed the Q10X to more accurately indicate its intraborough express service status. Some of the resources allocated to this southbound (i.e., from Kew Gardens to JFK Airport) AM weekday peak period only bus route would also be utilized to operate the new Q10LTD bus route mentioned previously.

Q11 Woodhaven Boulevard

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q11 experiences overcrowding during the AM and PM weekday peak periods as well as during the afternoon and early evening periods on Saturdays.

The Q11 is also a bus route that may be able to more effectively serve the Howard Beach, Hamilton Beach and Lindenwood communities in southern Queens. Opportunities to rationalize some of the transit service in the area with regards to both the Q21 and Q41 bus routes may be possible. Additionally, it would be desirable to connect the Q11's catchments area with the 74th Street-Broadway/Jackson Heights/Roosevelt Avenue Subway Station so that additional public transit connections (i.e., both with other bus routes as well as with additional subway lines) would be available in this portion of Queens.

Recommendations - On its northern end, this bus route would be extended from the Woodhaven Boulevard Subway Station to serve the 74th Street-Broadway/Jackson Heights/Roosevelt Avenue Subway Station via Queens Boulevard and Broadway. As previously mentioned, this modification would allow additional public transit connections (i.e., both with other bus routes as well as with additional subway lines) to become available in this portion of Queens.

There are two alternative proposals for the southern end of the Q11 bus route (i.e., south of the Rockaway Boulevard Subway Station). The goal of both proposals is to more effectively serve the Howard Beach, Hamilton Beach and Lindenwood communities in southern Queens. As was also previously mentioned, opportunities to rationalize some of the transit service in the area with regards to both the Q21 and Q41 bus routes may be possible. In the first alternative proposal, the Q11 would operate three distinct branches: the Q11 itself would serve Lindenwood primarily via the current route alignment of the Q41; the Q11A would operate via the current route alignment of the Howard

Beach branch of the Q11; and the Q11B would operate via the current route alignment of the Hamilton Beach branch of the Q11. All three branches would merge and operate along Woodhaven Boulevard to serve Jackson Heights. The advantage to this scheme is that a one-seat ride is provided between Jackson Heights and any one of the three southern terminals. Additionally, this arrangement makes the Queens Boulevard subway lines accessible to the residents of Howard Beach, Hamilton Beach and Lindenwood. However, some disadvantages are that the route may be difficult for patrons to comprehend and that schedule reliability may be negatively impacted by operating a single route with three branches throughout the service day.

The second alternative proposal for this bus route would have the Q11 bus route operate solely between its new northern terminal in Jackson Heights and Lindenwood. South of the Rockaway Boulevard Subway Station, the Q11 would operate primarily via the current route alignment of the Q41. The Howard Beach and Hamilton Beach branches would instead operate as independent bus routes (i.e., as the Q97 and the Q98) connecting these communities with the Q11 bus route at the Rockaway Boulevard Subway Station. The advantage to this scheme is that schedule reliability and patron comprehension would be superior to a single bus route with three different terminal branches. However, the disadvantage is that passengers on the Howard Beach and Hamilton Beach branches would no longer have a one-seat ride to Jackson Heights and other points north along Woodhaven Boulevard.

However, no matter which scheme is selected, the Lindenwood service on the modified Q11 would now operate via a slightly different route alignment than that currently operated by the Q41. In the southbound direction, after serving 157th Avenue and turning onto Cross Bay Boulevard, the modified Q11 would operate west on 160th Avenue, south on 84th Street, east on 164th Avenue, south on Cross Bay Boulevard, west on 165th Avenue and north on 84th Street back onto the route alignment. This modification would simplify the route alignment through Lindenwood and minimize the portion of the bus route operating via a one way loop.

Additionally, during the AM and PM weekday peak periods, as well as during the afternoon and early evening periods on Saturdays, additional service would be operated on the short turn route approximately every 10 minutes between the northern terminus of the Q11 bus route - which would be extended to Jackson Heights, as mentioned above - and the Rockaway Boulevard Subway Station to help alleviate some of the overcrowding on this bus route at these times. These 6 additional hourly trips would be above the current service levels.

No matter which scheme is selected, service to Howard Beach and Hamilton Beach would operate approximately every 30 minutes, with service to Lindenwood operating approximately every 15 minutes, thus closely approximating current headways.

In addition, no matter which of the two alternative proposals is selected, the Q11's trunk portion (i.e., between Jackson Heights and the Rockaway Boulevard Subway Station) may be a candidate for the use of articulated buses (i.e., 60-foot buses). The articulated buses would operate the same frequency of service as the standard 40-foot buses utilized on this portion of the Q11 today, thus alleviating some of the overcrowding on this bus route by virtue of their increased capacity.

Service on the Q11 will be complemented by a modified Q53 that will make stops at major transfer points along Cross Bay and Woodhaven Boulevards.

Q21 Cross Bay Boulevard

Issues - The Q21 is essentially duplicated by various other bus routes and exhibits relatively poor passenger productivity results.

Recommendations - This bus route would be eliminated. As mentioned previously, it is essentially duplicated by other bus routes and exhibits poor passenger productivity results. However, school tripper service would be operated through Lindenwood via the current alignment of the Q41 for students and other passengers in this area.

Q22 Rockaway Beach Boulevard

Issues - Although the Q22 provides service along the length of the Rockaway Peninsula, to utilize local buses to travel off of the Rockaway Peninsula (e.g., for travel to and from Kings Plaza Shopping Center in Brooklyn), passengers must at some point transfer to another bus route. This lack of a one-seat ride to major travel generators somewhat hinders the utility of this bus route. Opportunities to rationalize some of the transit service in the area with regards to the Q35 bus route may be possible.

Recommendations - On its western end, this bus route would be extended northward to serve both the Kings Plaza Shopping Center and the Brooklyn College-Flatbush Avenue Subway Station in Brooklyn along the current alignment of the Q35 bus route (i.e., via the Gil Hodges Bridge and Flatbush Avenue). A short turn route variation would operate between the Far Rockaway-Mott Avenue Subway Station and the intersection of Beach 169th Street and Rockaway Point Boulevard (i.e., the portion of the newly extended route which corresponds to the original Q22 bus route) in

order to maintain the current frequency of service along that portion of the bus route. In addition, supplemental school tripper service oriented to the needs of students would be operated on this bus route.

Finally, the trips that would operate along the entire length of the extended Q22 bus route into Brooklyn would operate limited stop service north of the Kings Plaza Shopping Center in Brooklyn. This service will replace the Q35 service which would be discontinued.

Q22A Mott Avenue

Issues - There are no major issues regarding this bus route.

Recommendations - This bus route would be renamed Q91 because, other than a common terminal point, it is not related to the Q22. Other possible proposals could include an expanded span of service or operating this route as a supplemental school day only branch of the Q22.

Q35 Marine Parkway

Issues - This bus route connects the Belle Harbor and Rockaway Park areas of the Rockaway Peninsula with the Brooklyn College-Flatbush Avenue Subway Station in Brooklyn. However, the Q35 does not provide service along the entire Rockaway Peninsula, thus requiring that passengers who reside in the eastern portion of the peninsula transfer to the Q35 from other local bus routes in order to reach the Kings Plaza Shopping Center and the subway. As was previously mentioned, opportunities to rationalize some of the transit service in the area with regards to the Q22 bus route may be possible.

Recommendations - This bus route would be eliminated because the extended Q22 would now provide bus service through this area. Service would not be provided along Newport Avenue; rather service will be a block away on Rockaway Beach Boulevard.

Q37 111th Street

Issues - The Q37 bus route may be able to more effectively serve both the South Ozone Park community as well as the southern Lefferts Boulevard corridor. As was previously mentioned, opportunities to rationalize some of the transit service in the area with regards to both the Q9 and Q10 bus routes may also be possible.

Recommendations - Service on the Q37 would no longer operate via 135th Avenue east of Lefferts Boulevard. rather now it would operate between Lefferts Boulevard and 130th Street via both

Lefferts Boulevard and Conduit Avenue (i.e., via the current alignment of the Q10). Service would also be extended south along 130th Street to serve the Department of Sanitation garage at 130th Street and 150th Avenue, which would also serve as the new southern terminal of the Q37. The Q37 would no longer operate via 135th Avenue.

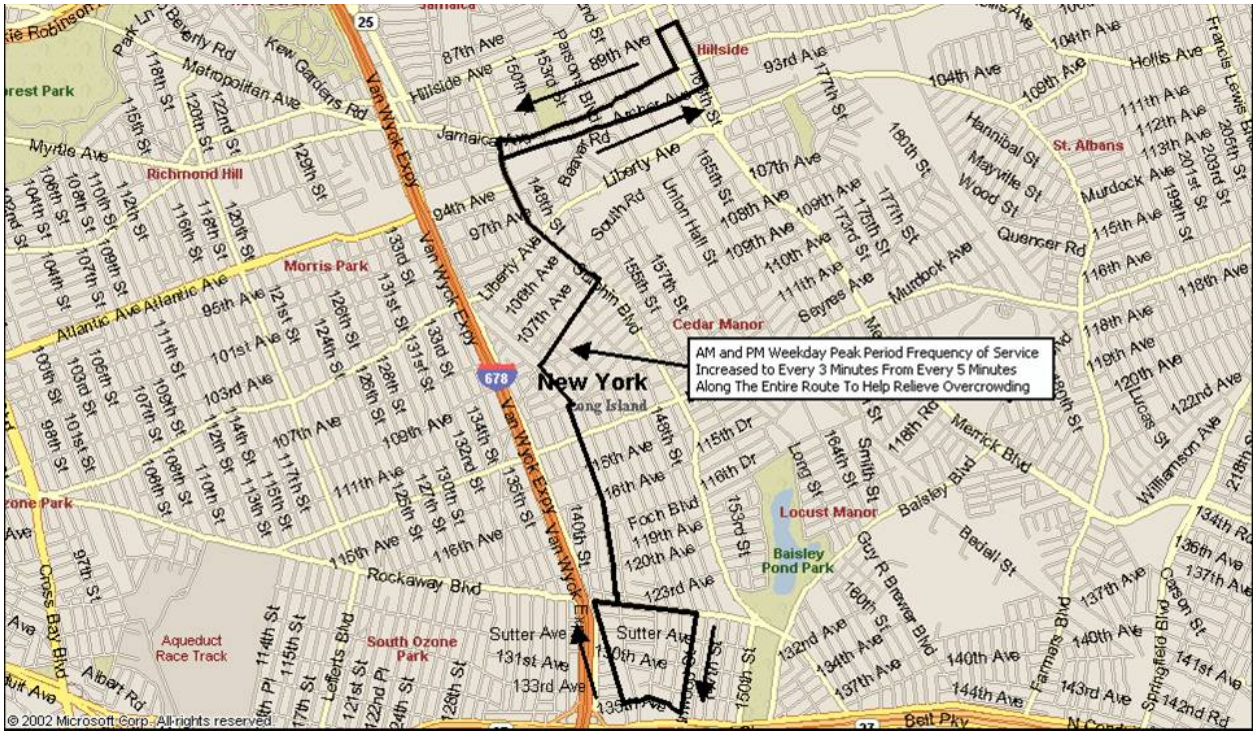
Q40 142nd Street

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q40 experiences overcrowding during the AM and PM weekday peak periods.

Additionally, it would be desirable for the Q40 to utilize a collection/distribution loop route in the Jamaica central business district's core area which provides greater service coverage. Providing service north to Hillside Avenue and the Sutphin Boulevard Subway Station is no longer viewed as such a necessity because the completion of the Archer Avenue extension of the subway has brought Queens Boulevard express subway service into Jamaica Center.

Recommendations - All Q40 service would now operate via Archer Avenue, 168th Street, 89th Avenue, Merrick Boulevard and Jamaica Avenue back to Sutphin Boulevard (i.e., via the route alignment of most other Green Line Buses through Jamaica). This route alignment would better serve the core of the Jamaica area. As previously mentioned, providing service north to Hillside Avenue and the Sutphin Boulevard Subway Station is no longer a necessity because the completion of the Archer Avenue extension of the subway has brought Queens Boulevard express subway service into Jamaica Center.

Additionally, during the AM and PM weekday peak periods the frequency of service on the Q40 would be increased (i.e., the headway would be reduced to a bus every 3 minutes), thus alleviating some of the overcrowding on this bus route.



Q41 127th Street

Issues - According to the ridership analysis, the Q41 essentially operates as two separate bus routes, with the Rockaway Boulevard Subway Station serving as the dividing point. Most passengers to and from the Lindenwood area do not ride past this subway station and the same is true of most passengers who utilize this bus route to and from Jamaica. Opportunities to rationalize some of the transit service in the area with regards to both the Q11 and Q21 bus routes may be possible.

Recommendations - The Q41 would operate solely between Jamaica and the Rockaway Boulevard Subway Station in Ozone Park. Q41 passengers would still be able to transfer to reach Jamaica on the Q11. Service to and from the Lindenwood area would now be provided via the Q11 bus route. The proposed truncated Q41 would utilize the same turn-around loop currently utilized by the Q112 bus route.

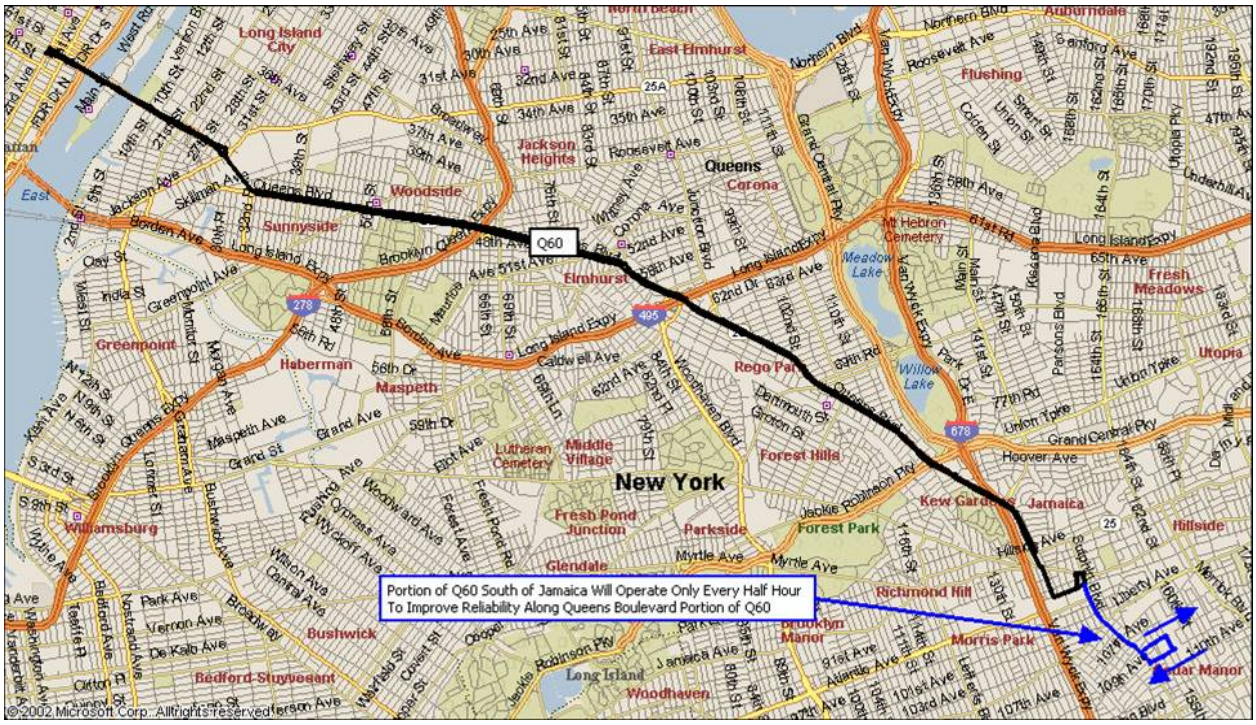
Q60 Queens Boulevard

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q60 experiences overcrowding on Saturday afternoons.

Additionally, it would be desirable for the Q60 to streamline its route alignment near its southern terminal in Jamaica. Schedule reliability may be enhanced if the Q60 did not always have to operate through Jamaica to serve Sutphin Boulevard.

Recommendations - The southern terminal of the Q60 bus route would be restructured so that most service ends at the Jamaica LIRR Station/Sutphin Boulevard/Archer Avenue Subway Station. Service south of Jamaica (i.e., to the intersection of 108th Avenue and 157th Street) would operate approximately every 30 minutes. This modification would allow the Q60 to improve its schedule reliability by not having to operate through the central portion of Jamaica.

On Saturday afternoons, the frequency of service on the Q60 would be increased (i.e., the headway would be reduced to a bus every 5 minutes), thus alleviating some of the overcrowding on this bus route.



Jamaica Buses

Q110 Jamaica Avenue

Issues - It would be desirable for the Q110 bus route to utilize a collection/distribution loop route in

the Jamaica central business district's core area that provides service to the Jamaica Center-Parsons/Archer Subway Station. Providing service north to Hillside Avenue and the Parsons Boulevard Subway Station is no longer viewed as such a necessity because the completion of the Archer Avenue extension of the subway has brought Queens Boulevard express subway service into Jamaica Center. In addition, a peak period route variation of the Q110 serves this subway line via the Jamaica-179th Street Subway Station.

The opportunity exists to provide continuous service along the length of Jamaica Avenue utilizing the Q110 bus route.

Recommendations - The existing short route variation of the Q110 operating during the AM and PM weekday peak periods between the eastern terminal of the route and the Jamaica-179th Street Subway Station would be called the Q110A.

In addition to this route nomenclature change, there are two alternative proposals for this bus route. In the first alternative proposal, those trips not operating via the Q110A bus route would operate through the central portion of Jamaica via westbound Jamaica Avenue, south on 150th Street, east on Archer Avenue and north on 168th Street back to the original route alignment on Jamaica Avenue in order to directly serve the Jamaica Center-Parsons/Archer Subway Station.

The second alternative proposal - which is more characteristically a long term recommendation - is to merge the Q110 with the Q56, operated by New York City Transit. This would create a single bus route along the entire length of Jamaica Avenue. From the intersection of Jamaica Avenue and 171st Street (i.e., the easternmost location in common to both bus routes), the Q110 would operate via the route alignment of the Q56 to the Broadway Junction/East New York Subway Station in Brooklyn. A short turn route variation would operate between the Broadway Junction/East New York Subway Station and the intersection of Jamaica Avenue and 171st Street (i.e., the portion of the newly extended route which corresponds to the original Q56 bus route) in order to maintain the current frequency of service along that portion of the bus route. This proposal would create a one-seat ride along the length of Jamaica Avenue via the core of the Jamaica area. However, one drawback to this proposal is that such a lengthy bus route would be more likely to encounter schedule reliability issues.

Finally, whether or not the Q110 and the Q56 are merged, the eastern terminal of the Q110 would be relocated to the intersection of Jamaica Avenue and 257th Street (i.e., the current terminal of the Q36 bus route). This would provide continuous local bus service along the eastern portion of Jamaica Avenue. The Q36 bus route would instead operate along Hempstead Avenue to the current terminal of the Q110 at Belmont Park. The decision to combine bus routes would depend on the results of an origin-destination survey.

Q111 Guy R. Brewer Boulevard

Issues - When the service standards currently utilized by NYCDOT are applied, they indicate that the Q111 experiences overcrowding during the shoulders of the AM and PM weekday peak periods.

The Q111 is also a bus route which may be able to more effectively serve certain areas of JFK International Airport, due to its direct approach from the Jamaica area via Guy R. Brewer Boulevard and the fact that the areas of the airport it operates nearest to is not directly served by the AirTrain system. Additionally, the Q111 bus route may be able to more effectively serve the Rosedale community in eastern Queens by connecting it with the Green Acres Mall in Valley Stream. This would present an opportunity to create some new public transit connections in this portion of Queens.

Finally, similar to the Q110, it would also be desirable for the Q111 bus route to utilize a collection/distribution loop route in the Jamaica central business district's core area that terminates at the Jamaica Center-Parsons/Archer Subway Station. Providing service north to Hillside Avenue and the Parsons Boulevard Subway Station is no longer viewed as such a necessity because the completion of the Archer Avenue extension of the subway has brought Queens Boulevard express subway service into Jamaica Center.

Recommendations - A new service would operate to Building 77 (i.e., AMB Cargo Center) at JFK International Airport via Guy R. Brewer Boulevard, Farmers Boulevard and North Boundary Road. This service would be called the Q111A and would operate every 15 minutes during weekday AM and PM peak periods. This modification would allow a direct connection to be made between the Guy R. Brewer Boulevard corridor and this portion of JFK International Airport.

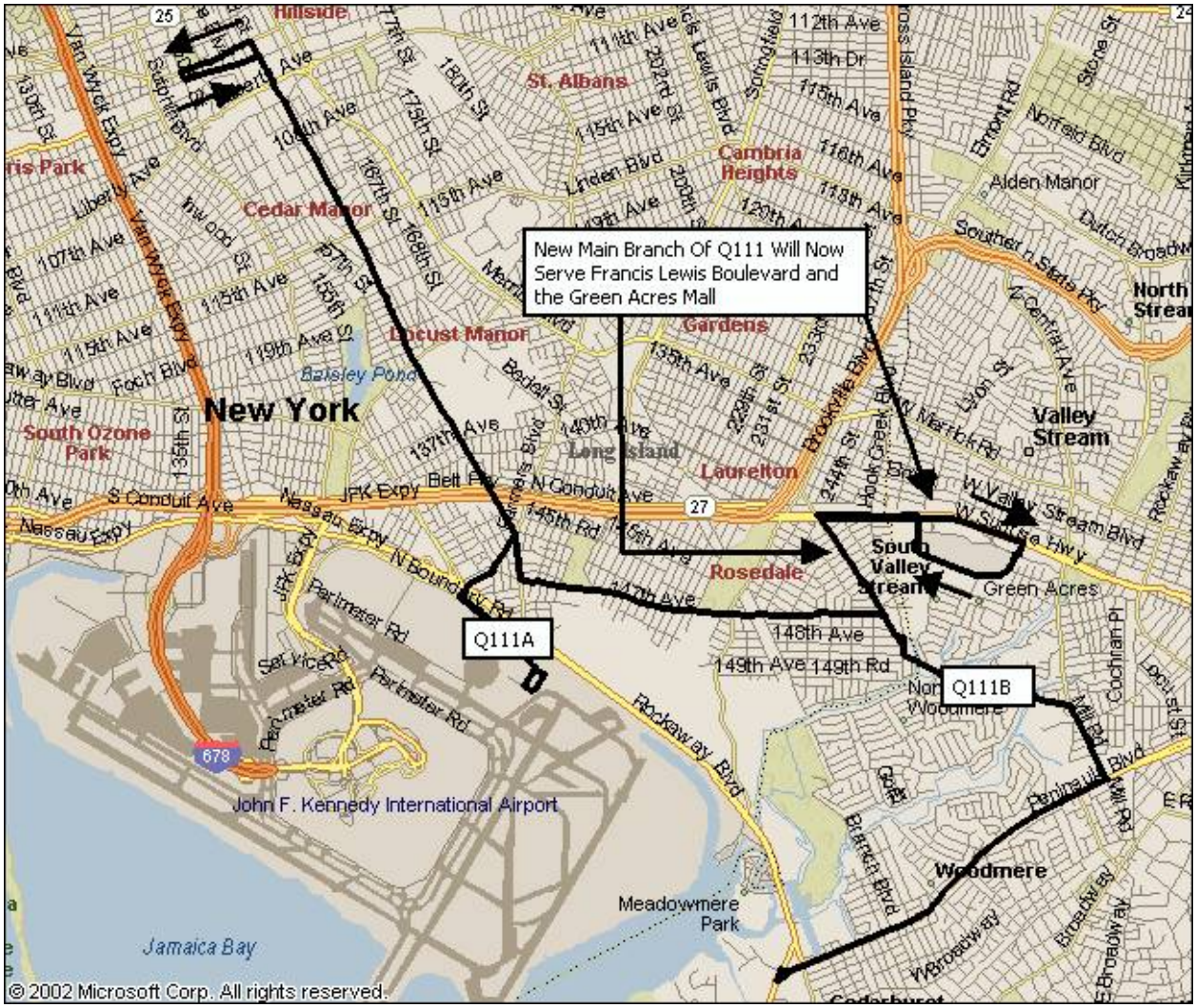
The special tripper service operated via Peninsula Boulevard would remain unchanged. However, this existing branch of the bus route would be renamed the Q111B.

Throughout the service day, the Q111 and - during the AM and PM weekday peak periods - the Q111A and Q111B bus routes would operate through the central portion of Jamaica via northbound Guy R. Brewer Boulevard, westbound Jamaica Avenue, south on 150th Street and east on Archer Avenue back to the original route alignment on Guy R. Brewer Boulevard in order to utilize the Jamaica Center-Parsons/Archer Subway Station as their terminal point. This modification would provide enhanced coverage through the core of the Jamaica area.

Additionally, the eastern terminal of the Q111 would be relocated to the Green Acres Mall in Valley Stream. The Green Acres Mall would be accessed via Francis Lewis Boulevard and Conduit

Avenue from the current 147th Avenue alignment of the bus route. During hours that the Green Acres Mall is not open, the eastern terminal of the Q111 would continue to be in Rosedale at the intersection of Francis Lewis Boulevard and 148th Avenue. This relatively straightforward route extension allows direct service to be operated to this major shopping center from the Guy R. Brewer Boulevard corridor and Rosedale.

Finally, the duration of the peak period service levels on the Q111 bus route would be extended to include the shoulders of the AM and PM weekday peak periods, thus alleviating some of the overcrowding on this bus route.



Q112 Liberty Avenue

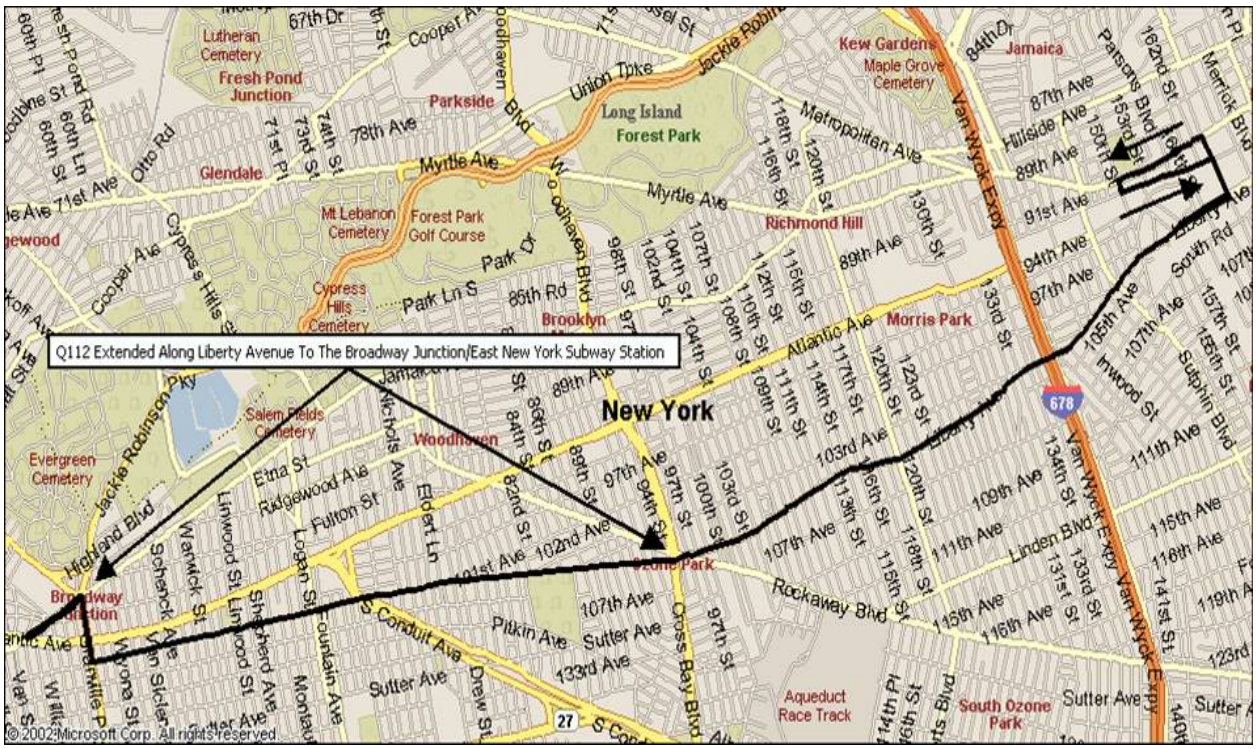
Issues - Similar to the Q111, it would also be desirable for the Q112 bus route to utilize a collection/distribution loop route in the Jamaica central business district's core area that terminates at the Jamaica Center-Parsons/Archer Subway Station. Providing service north to Hillside Avenue and the Parsons Boulevard Subway Station is no longer viewed as such a necessity because the completion of the Archer Avenue extension of the subway has brought Queens Boulevard express subway service into Jamaica Center. In addition, opportunities exist to streamline the Q112 route alignment path in the vicinity of Jamaica.

Finally, the opportunity exists to provide continuous service along most of the length of Liberty Avenue utilizing the Q112 bus route.

Recommendations - On its eastern end, the Q112 bus route would simply utilize Liberty Avenue directly to and from Guy R. Brewer Boulevard in the vicinity of Jamaica; the Q112 would therefore no longer operate via South Road. This would improve access to York College.

Also on its eastern end, the Q112 bus route would operate through the central portion of Jamaica via northbound Guy R. Brewer Boulevard, westbound Jamaica Avenue, south on 150th Street and east on Archer Avenue back to the original route alignment on Guy R. Brewer Boulevard throughout the service day. This would allow the Q112 bus route to utilize the Jamaica Center-Parsons/Archer Subway Station as its terminal point. This modification would provide more effective coverage through the core of the Jamaica area.

On its western end, the Q112 bus route would be extended along Liberty Avenue into Brooklyn and would terminate at the Broadway Junction/East New York Subway Station. This would provide a one-seat ride between Jamaica and East New York via the Liberty Avenue corridor. In addition, it also would allow the B12 bus route to utilize the Broadway Junction/East New York Subway Station as its eastern terminus.



Q113 Guy R. Brewer Boulevard/Far Rockaway Limited

Issues - When the service standards currently utilized by NYCDOT are applied, they indicate that the Q113 experiences overcrowding during the AM and PM weekday peak periods as well as during the late afternoon and early evening periods on Saturdays.

Similar to the Q112, it would also be desirable for the Q113 and Q113LTD bus routes to utilize a collection/distribution loop route in the Jamaica central business district's core area that terminates at the Jamaica Center-Parsons/Archer Subway Station. Providing service north to Hillside Avenue and the Parsons Boulevard Subway Station is no longer viewed as such a necessity because the completion of the Archer Avenue extension of the subway has brought Queens Boulevard express subway service into Jamaica Center. In addition, opportunities exist to streamline the Q113LTD's route alignment path in the vicinity of Brookville Park.

Recommendations - The frequency of the existing limited stop service on the Q113 bus route would be improved so that the Q113LTD bus route is operated every five minutes, thereby alleviating some of the overcrowding on this bus route during the AM and PM weekday peak periods. The Q113LTD would also utilize Rockaway Boulevard directly to and from Guy R. Brewer Boulevard; this would reduce the travel time for the Q113LTD and would remove Q113LTD service from Brookville

Boulevard, which would continue to be served by the Q113. Additionally, when the Q113LTD operates on Guy R. Brewer Boulevard it would continue to operate limited stop service along the entire corridor to and from Jamaica. In effect, the zone of limited stop service on the Q113LTD would extend between the intersection of Bayview Avenue and Beach Channel Drive in Far Rockaway and Jamaica.

Additionally, all regular Q113 buses would also only operate limited stop service along the entire corridor on Guy R. Brewer Boulevard to and from Jamaica. The limited stop service zone on the Q113 would extend between the intersection of Brookville Boulevard and 147th Avenue and Jamaica. These modifications to the limited stop service zones are possible because local service would continue to be operated along this entire corridor by the Q111; they also allow for improved travel times on the Q113 bus route.

The combined effect of these proposals on Guy R. Brewer Boulevard service is that the Q111 would always provide local service along this corridor and both the Q113 and Q113LTD would always provide limited stop service, with the Q113LTD also providing limited stop service further out along the bus route to and from the Far Rockaway community.

Throughout the service day, both the Q113 and - during the AM and PM weekday peak periods - the Q113LTD bus routes would operate through the central portion of Jamaica via northbound Guy R. Brewer Boulevard, westbound Jamaica Avenue, south on 150th Street and east on Archer Avenue back to the original route alignment on Guy R. Brewer Boulevard in order to utilize the Jamaica Center-Parsons/Archer Subway Station as their terminal point. This modification would provide enhanced coverage through the core of the Jamaica area.

Finally, during the late afternoon and early evening periods on Saturdays this bus route would operate with a 15 minute frequency of service for a longer period of time that it presently does (i.e., half hourly service would not commence until approximately 9:00PM), thus alleviating some of the overcrowding on this bus route at these times.

Queens Surface Corporation

Q25 Parsons Boulevard and Q34 Parsons Boulevard

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that - taken together - the Q25 and Q34 bus routes experience overcrowding during the AM and PM weekday peak periods as well as during the midday and afternoon periods on both weekdays and - for the Q25 - Saturdays.

According to the ridership analysis, the Q25 essentially operates as two separate bus routes, with the Flushing-Main Street Subway Station marking the dividing point. Most passengers to and from the College Point area do not ride past this subway station and the same is true of most passengers who utilize this bus route to and from Jamaica. Opportunities to rationalize some of the transit service in the area with regards to both the Q25 and Q34 bus routes may be possible because of the large amount of duplication in terms of their route alignments.

Recommendations - As was previously mentioned, the Q25 essentially operates as two separate bus routes, with the Flushing-Main Street Subway Station marking the dividing point. To help address this ridership pattern and improve service reliability, the Q25 bus route would be split into two segments. Although ridership suggests splitting this route in Flushing, the logistics of turning extra buses around in this congested area might preclude such a move. This issue may apply to other recommendations for this operator. The first segment would continue to be called the Q25 and would operate between the Flushing-Main Street Subway Station and Jamaica. The current peak period short route variation that operates between the intersection of Jewel Avenue and Kissena Boulevard and the Flushing-Main Street Subway Station - thus providing additional capacity on this more heavily utilized portion of the bus route - would continue to be operated, although it would now technically become a short turn variation of the basic Q25.

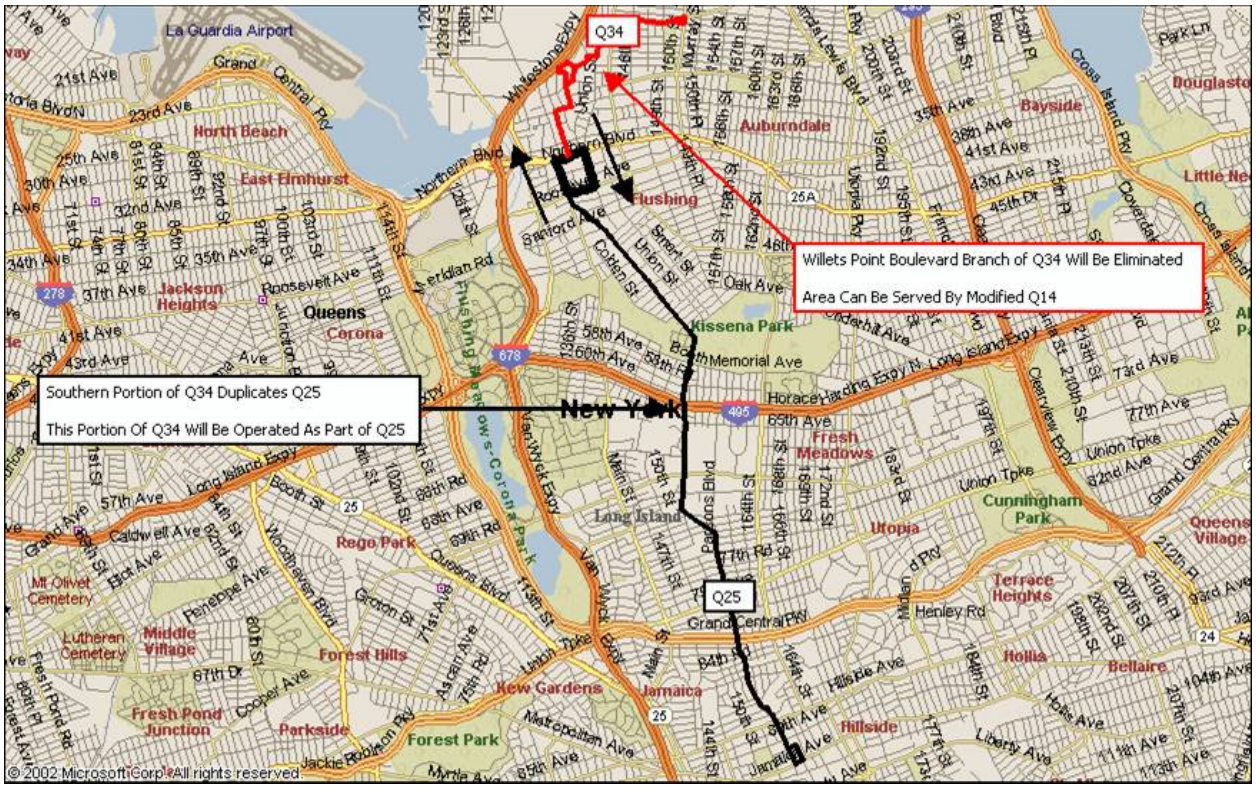
During the AM and PM weekday peak periods, limited stop service would be operated along the length of the newly-truncated Q25 bus route to help alleviate overcrowding and improve travel times. The Q25LTD would operate about every 10 minutes.

The northern segment of this bus route between the Flushing-Main Street Subway Station and College Point would continue to operate with the same frequency and span of service as it presently operates. However, the northern segment would now be called the Q93.

During both the weekday midday and Saturday midday periods the modified Q25 bus route would operate with an improved frequency of service between Flushing and Jamaica to help alleviate overcrowding. Service that operates every 10 minutes during the weekday midday period would operate approximately every 7.5 minutes (i.e., eight buses per hour rather than six buses per hour). Service that operates every 15 minutes during the Saturday midday period would operate approximately every 10 minutes. However, during these time periods this bus route may be a candidate for the use of articulated buses (i.e., 60-foot buses). The articulated buses would operate the same frequency of service as the standard 40-foot buses utilized on the Q25 today, thus alleviating some of the overcrowding which occurs along this corridor by virtue of their increased capacity.

The Q34 bus route would be eliminated because it duplicates the Q25 for most of its route

alignment. The route segments unique to the Q34 would be assumed by a modified Q14 bus route.



Q65 164th Street

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q65 experiences overcrowding during the AM and PM weekday peak periods.

According to the ridership analysis, the Q65 is similar to the Q25 in that it operates as two separate bus routes, with the Flushing-Main Street Subway Station marking the dividing point. Many passengers to and from the College Point area do not ride past the Flushing-Main Street Subway Station and the same is true of many passengers who utilize this bus route to and from Jamaica. However, the split at Flushing is not as pronounced as it is with the Q25.

Finally, the opportunity also exists to provide a one-seat ride local bus service along the length of College Point Boulevard north of Flushing utilizing the Q65 bus route.

Recommendations - There are two alternative proposals for this bus route. In the first alternative proposal, a new Q65A branch service would be operated approximately every hour throughout the

service day. The Q65A would utilize the terminal loop of the Q25 in College Point, thus providing local bus service along the entire length of College Point Boulevard.

As part of this proposal, during the AM and PM weekday peak periods limited stop service would be operated between the Flushing-Main Street Subway Station and Jamaica to help alleviate overcrowding and improve travel times. The Q65LTD would operate about every 10 minutes.

The second alternative proposal for this bus route would split the bus route into two segments. As was previously mentioned, the Q65 essentially operates as two separate bus routes, with the Flushing-Main Street Subway Station marking the dividing point. To help address this ridership pattern and improve service reliability, the first segment will continue to be called the Q65 and would operate between the Flushing-Main Street Subway Station and Jamaica via 164th Street. The second segment would be called the Q95 and would operate between the Flushing-Main Street Subway Station and College Point. The Q95 would continue to operate with the same frequency and span of service as is presently operated along this portion of the bus route. Similar to the first alternative proposal, a Q95A branch service would be operated approximately every hour throughout the service day. The Q95A would utilize the terminal loop of the Q25 in College Point, thus providing local bus service along the entire length of College Point Boulevard.

As part of the second alternative proposal, during the AM and PM weekday peak periods limited stop service would also be operated between the Flushing-Main Street Subway Station and Jamaica to help alleviate overcrowding and improve travel times, as it would be with the first alternative proposal. The Q65LTD would again operate about every 10 minutes.

Q65A Jewel Avenue

Issues - There are no major issues regarding this bus route. However, the Q65A provides an opportunity to fill in a service gap along Jewel Avenue in the Utopia area of Queens, thus creating some new public transit connections in this portion of Queens.

Recommendations - During the AM and PM weekday peak periods, this bus route would be extended via Jewel and 73rd Avenues as far east as Francis Lewis Boulevard. The current weekday AM peak period short turn at Jewel Avenue and Kissena Boulevard would be eliminated. Finally, this newly modified bus route would be renamed the Q94 to better indicate that it is not related to the Q65.

Q66 Northern Boulevard

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q66 experiences overcrowding during the AM weekday peak period.

The opportunity also exists to provide a one-seat ride local bus service along most of the length of Northern Boulevard utilizing the Q66 bus route as a basis for the service. Providing continuous local bus service along the length of this major east-west corridor presents an opportunity to create some new public transit connections throughout northern Queens.

Finally, it would be desirable for the Q66 to streamline its route alignment near its western terminal in Long Island City in order to better serve certain major generators located in that community.

Recommendations - This bus route would be merged with the Q12 bus route operated by New York City Transit, thus creating a new one-seat ride bus route along most of the length of Northern Boulevard. These two bus routes would be combined via Flushing at the Flushing-Main Street Subway Station and would simply be known as the Q66. As was previously mentioned, providing continuous local bus service along the length of this major east-west corridor presents an opportunity to create some new public transit connections throughout northern Queens. This recommendation

would be based on the results of an origin-destination survey.

The current short turn variation of the Q66 between the intersection of 51st Street and Northern Boulevard and the Flushing-Main Street Subway Station would continue to be operated, thus providing additional capacity along the more heavily utilized portion of this bus route.

During the weekday AM peak period the modified Q66 bus route would operate with an improved frequency of service to help alleviate overcrowding. Service that operates every 5 minutes during this time period would operate approximately every 3.5 minutes (i.e., 18 buses per hour rather than 12 buses per hour). However, during these time periods this bus route may be a candidate for the use of articulated buses (i.e., 60-foot buses). The articulated buses would operate the same frequency of service as the standard 40-foot buses utilized on the Q66 today, thus alleviating some of the overcrowding which occurs along this corridor by virtue of their increased capacity.

Finally, on its western end, the Q66 would be extended through the Long Island City area to better serve this community and provide coverage to major travel generators. The route alignment of the Q66 would follow that of the Q19A through Long Island City.

Q67 Calvary Cemetery

Issues - The Q67 exhibits relatively poor farebox recovery and passenger productivity results.

Recommendations - The Q67 would only operate during the AM and PM weekday peak periods and continue to provide a commuter oriented service between Maspeth and Long Island City. Service at all other times would be eliminated.

Q101 Steinway Street

Issues - There are no major issues regarding this bus route.

Recommendations - No changes are proposed for this bus route.

Q101R Rikers Island Limited

Issues - There are no major issues regarding this bus route. However, the Q101R provides an opportunity to fill in a service gap along 20th Avenue in the Astoria area of Queens, thus creating some new public transit connections in this portion of Queens.

Recommendations - No route alignment changes are proposed for this bus route. This bus route

would operate local service north of the intersection of Ditmars Boulevard and 21st Street (i.e., along those portions of the route alignment which are not currently served by other local bus routes). This would allow passengers in this portion of Astoria to access the various subway lines in Long Island City. Limited stop service would continue to be operated along most of the length of 21st Street.

Additionally, the Q101R would be renamed the Q92LTD to better reflect both the fact that it is not related to the Q101 and that it will operate a limited stop service between the Queensboro Plaza Subway Station and the intersection of Ditmars Boulevard and 21st Street while en route to and from Rikers Island.

Q102 31st Street

Issues - There are no major issues regarding this bus route. However, the Q102 provides an opportunity to fill in a service gap along both 31st Street and 20th Avenue in the Astoria area of Queens, thus creating some new public transit connections in this portion of Queens. The Q102's northwestern terminal was recently extended to serve the housing complex at the intersection of 27th Avenue and 2nd Street.

Recommendations - Alternating trips on the Q102 bus route would serve the 19th Avenue and Hazen Street terminal of the Q101 bus route via 31st Street and 20th Avenue. This new branch would be called the Q102A and would operate throughout the entire service day on weekdays, Saturdays and Sundays. The Q102A would allow for a continuous bus route along most of the length of 31st Street in Astoria and serve the Astoria-Ditmars Boulevard Subway Station.

Q103 Vernon Boulevard

Issues - There are no major issues regarding this bus route. However, similar to the Q102, the Q103's northern terminal was recently extended to serve the housing complex at the intersection of 27th Avenue and 2nd Street.

The waterfront area of Long Island City served by this bus route is slowly being redeveloped. This area has recently been rezoned by the Department of City Planning to accommodate a greater level of development, and in the long term future some weekend service on the Q103 may be feasible.

Recommendations - No changes are proposed for this bus route at this time. The weekday AM and PM peak period feeder service to and from the Hunters Point ferry terminal should be reinstated.

Q104 Broadway

Issues - There are no major issues regarding this bus route.

Recommendations - No changes are proposed for this bus route.

QBx1 Co-op City/Pelham Bay/Flushing

Issues - The QBx1 is a very complex bus route. The basic service operates between Flushing and the Pelham Bay Park Subway Station in The Bronx. During the AM and PM weekday peak periods, these QBx1 trips are extended to serve the Bellamy Loop area of Co-op City. Also during these peak periods, other QBx1 trips serve only to connect the remaining areas of Co-op City with the Pelham Bay Park Subway Station. In this way, during the peak periods all of the areas of Co-op City served by the QBx1 bus route have a direct trip to the Pelham Bay Park Subway Station, but only those passengers from the Bellamy Loop area enjoy a one-seat ride to Flushing.

During the off-peak periods, the QBx1 trips serving Flushing also serve all of the various sections of Co-op City in addition to the Pelham Bay Park Subway Station. In this way, all of Co-op City enjoys a one-seat ride to Flushing, albeit an indirect one due to the need to circulate throughout every section of Co-op City. In addition, during the off-peak periods other QBx1 trips circulate through every section of Co-op City and serve only the Pelham Bay Park Subway Station, thereby not serving Flushing but providing supplemental service between Co-op City and the Pelham Bay Park Subway Station.

This complex route operating pattern would be simplified in order to increase patron comprehension of the bus system.

According to the ridership analysis, the QBx1 essentially operates as two separate bus routes, with the Pelham Bay Park Subway Station marking the dividing point. Most passengers to and from Co-op City do not ride past this subway station; the same is true of most passengers who utilize this bus route to and from Flushing.

Finally, there is less of a need for residents of Co-op City to shop in Flushing since the opening of the Bay Plaza Shopping Center in Co-op City.

Recommendations - This bus route would be split throughout the entire service day into two separate basic segments: service between Flushing and the Pelham Bay Park Subway Station, and service between the Pelham Bay Park Subway Station and Co-op City.

Service between Flushing and the Pelham Bay Park Subway Station would continue to be called the QBx1 and would operate with approximately the same frequency of service as is currently operated between Queens and The Bronx.

Service between the Pelham Bay Park Subway Station and Co-op City would also continue to operate with approximately the same frequency of service as is currently operated between these two points; however, the route nomenclature would be modified to more accurately reflect the nature of the service. The basic off-peak service between the Pelham Bay Park Subway Station and all of the various sections of Co-op City would be called the Bx56 bus route. During the AM and PM weekday peak periods, the relatively direct "shuttle" trips would continue to be operated between individual sections of Co-op City and the Pelham Bay Park Subway Station. During these time periods, the Asch Loop trips would be called the Bx56A, the Bellamy Loop trips would be called the Bx56B and the Section 5 trips would be called the Bx56C.

Triboro Coach Corporation

Q18 30th Avenue

Issues - There are no major issues regarding this bus route. However, the Q18 provides an opportunity to fill in a part-time service gap created by the partial discontinuation of the Q67 bus route along 69th Street in the Middle Village area of Queens, thus maintaining the availability of several public transit connections in this portion of Queens.

Similar to the Q102 and the Q103, the Q18's northern terminal was recently extended to serve the housing complex at the intersection of 27th Avenue and 2nd Street.

Recommendations - The Q18 bus route would be extended on its southern end to serve Middle Village and the Metro Mall from Hamilton Place via Grand Avenue, 69th Street and Metropolitan Avenue. The bus route would then turn around utilizing Metropolitan Avenue, Eliot Avenue and Fresh Pond Road back onto Metropolitan Avenue. Northbound service would operate directly from 69th Street onto Jay Avenue to resume the present route alignment path. The modified Q18 would operate with the same frequency and span of service as the current bus route.

Q19 Astoria Boulevard

Issues - The Q19 bus route may be able to more effectively serve the Astoria, East Elmhurst and Corona communities in northern Queens by providing a one-seat ride local bus service along most of the length of Astoria and Northern Boulevards that would more conveniently connect them with Flushing. This would present an opportunity to fill in a minor service gap as well as to create some new public transit connections in this portion of Queens.

It would also be desirable for the Q19 to modify its route alignment near its western terminal in Astoria in order to better serve certain major generators located in that community.

Recommendations - The Q19 would be extended on its western end via Astoria Boulevard, Main Avenue, 8th Street and 27th Avenue to serve the housing complex at the intersection of 27th Avenue and 2nd Street. The Q19 would no longer operate on Hoyt Avenue.

On its eastern end, the Q19 would be extended via Astoria Boulevard, Northern Boulevard and Main Street to serve the Flushing-Main Street Subway Station.

Finally, the Q19 would operate every 30 minutes during the AM and PM weekday peak periods, and every hour at all other times. The span of service on the Q19 bus route would remain unaltered.

Q19A 21st Street

Issues - There are no major issues regarding this bus route.

Recommendations - No route alignment changes are proposed for this bus route. However, this bus route would be renamed the Q89 because it is not related to the Q19 bus route.

Q19B 35th Avenue

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q19B experiences some overcrowding during the AM and PM weekday peak periods.

Recommendations - To help alleviate the peak period overcrowding on the most heavily traveled portion of the Q19B bus route, a new short turn location would be established at the intersection of Astoria Boulevard and 92nd Street. This short turn would be utilized during the AM and PM weekday peak periods.

Additionally, this bus route would be renamed the Q90 because it is not related to the Q19 bus route.

Q23 108th Street

Issues - When the loading standard currently utilized by NYCDOT is applied, it indicates that the Q23 experiences some overcrowding during the AM and PM weekday peak periods.

It would also be desirable for the Q23 to streamline its route alignment near its southern terminal in Forest Hills. The size of the large one-way turnaround loop near the Crescent Apartments may be reduced, with bi-directional service operating along Union Turnpike in its place.

The Q23 is also a bus route that may be able to more effectively serve LaGuardia Airport. It would be desirable to connect the Q23's catchments area with the airport so that passengers in Forest Hills would have a convenient one-seat ride to and from LaGuardia Airport.

Recommendations - To help alleviate the peak period overcrowding on the most heavily traveled portion of the Q23 bus route, the present peak period short turn location at 62nd Drive and 108th Street would be moved further north to the 103rd Street-Corona Plaza Subway Station. This would allow passengers in Forest Hills access to an additional subway line. This short turn would also be operated only during the AM and PM weekday peak periods.

On its southern end, the Q23 would modify its turnaround loop past the Crescent Apartments as follows: from westbound Metropolitan Avenue onto southbound 71st Avenue, then west on Union Turnpike, south on 88th Street, west on Myrtle Avenue, east on Union Turnpike and back onto northbound 71st Avenue to resume the present route alignment. As previously mentioned, the size of the large one-way turnaround loop near the Crescent Apartments would be reduced.

Finally, on its northern end the Q23 would be extended to operate into LaGuardia Airport. An advantage of this extension is the opportunity to connect to other Queens bus routes. From Ditmars Boulevard it would enter the airport via the 23rd Avenue bridge (i.e., via the alignment of the Q48 bus route) and then operate through the eastern portion of the airport via the same alignment as the Q33 bus route (i.e., no service would be provided to the Marine Air Terminal). Upon exiting the airport via the 94th Street Bridge, the route would operate eastbound on Ditmars Boulevard to resume its current route alignment. As was previously mentioned, it would be desirable to connect the Q23's catchments area with the airport so that passengers in Forest Hills would have a convenient one-seat ride to and from LaGuardia Airport.

Finally, the modified Q23 would operate with the same frequency and span of service as is presently operated on this bus route.

Q29 80th Street

Issues - There are no major issues regarding this bus route.

Recommendations - No changes are proposed for this bus route. The AM weekday peak period short turn at the Woodhaven Boulevard Subway Station would be retained.

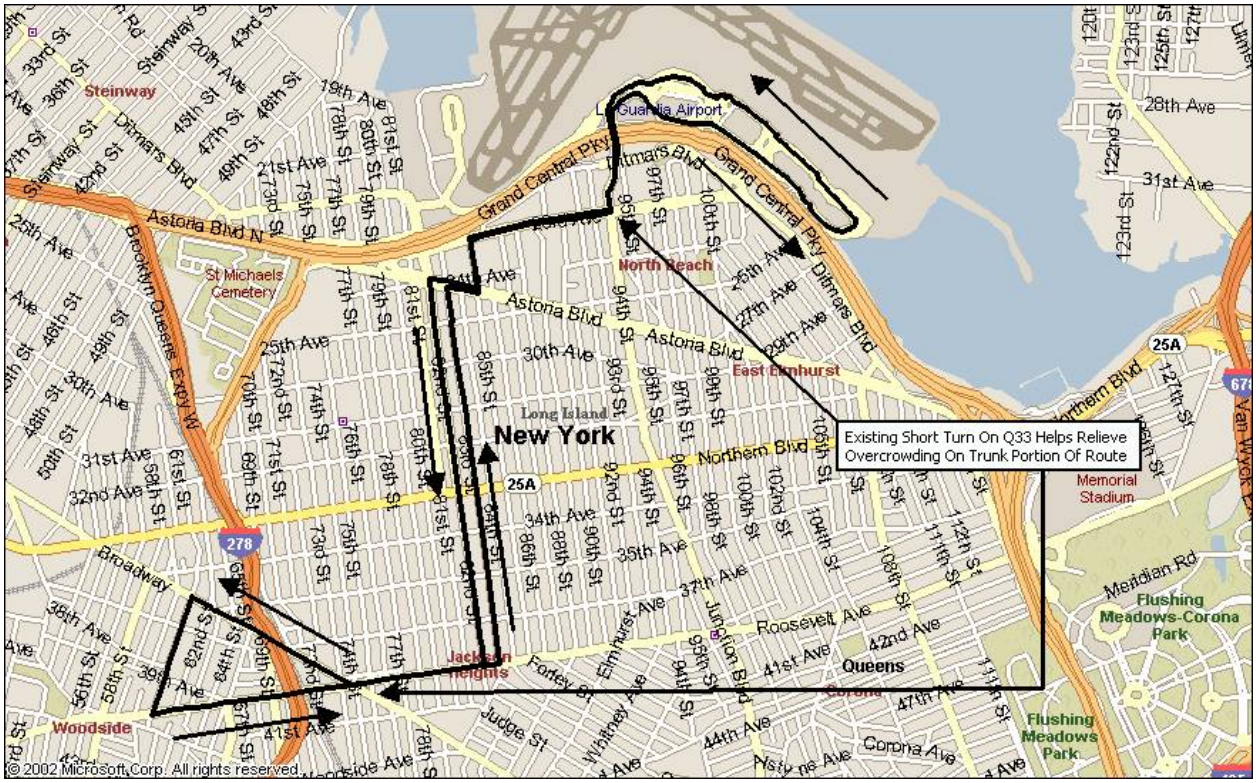
Q33 82nd Street

Issues - There are no major issues regarding this bus route. However, the Q33 provides an

opportunity to provide a connection between the Long Island Rail Road and LaGuardia Airport, thus providing customers on all branches of the LIRR a direct link to this airport.

Recommendations - On its southern end, the Q33 would be extended from the 74th Street-Broadway/Jackson Heights/Roosevelt Avenue Subway Station to serve the Woodside Station of the Long Island Rail Road via Broadway, 61st Street and Roosevelt Avenue (i.e., via the same alignment currently operated by the Q53 bus route).

The AM and PM weekday peak period short turn at 94th Street and 23rd Avenue would be retained. The modified Q33 would operate with the same frequency and span of service as is presently operated on this bus route.



Q38 Eliot Avenue

Issues - This bus route operates in what is almost a completely closed bi-directional loop pattern. It connects the Elmhurst and Rego Park communities with the Middle Village area and the Metro Mall. Some modifications to the bus route's alignment as well as some adjustments to the route's nomenclature would serve both to improve patron comprehension of this bus route as well as to

improve the operation of the Q38.

Recommendations - On its southern leg, the Q38 would be extended one block east from 110th Street to the Grand Central Parkway Service Road. On its northern leg, the Q38 would be extended from its present terminal at 60th and Otis Avenues northeast along Otis Avenue to 108th Street, thus allowing passengers on the northern leg access to the Q23 bus route.

However, in terms of the bus route's operation, 108th Street would be able to be utilized to operate buses between the two legs of the Q38 in non-revenue (i.e., "deadhead") service whenever necessary.

In terms of route nomenclature, the northern leg of the Q38 (i.e., that segment of the bus route that operates between the intersection of 108th Street and Otis Avenue and the Middle Village-Metropolitan Avenue Subway Station via Eliot Avenue and the Metro Mall) would become the Q38N. The southern leg of the Q38 (i.e., that segment of the bus route that operates between the intersection of the Grand Central Parkway Service Road and 62nd Drive and Fresh Pond Road via 63rd Drive, the Middle Village-Metropolitan Avenue Subway Station and the Metro Mall) would become the Q38S. However, all buses will continue to operate through to the other leg as they do today. The "N" or "S" suffix after the route number will allow passengers to recognize what leg of the route the bus is currently operating on; this could be especially important for passengers transferring from other local bus routes which serve both legs of the Q38 (e.g., the Q29).

Finally, the Q38N and Q38S would operate every 15 minutes during the AM and PM weekday peak periods, and every 30 minutes at other times. The span of service on the Q38N and Q38S would remain unaltered.

Q39 Forest Avenue

Issues - There are no major issues regarding this bus route. However, the Q39 may serve as the basis for creating a one-seat ride between the Long Island City community and the Metro Mall in Middle Village. This would present an opportunity to fill in a minor service gap as well as to create some new public transit connections in this portion of Queens.

Recommendations - Throughout the entire service day, every other trip on the Q39 would operate to and from the Metro Mall from Fresh Pond Road via Metropolitan Avenue. This branch of the bus route would be called the Q39A. The combined Q39 and Q39A (i.e., those portions of the bus route north of the intersection of Fresh Pond Road and Eliot Avenue which remain unaltered) would operate with the same frequency and span of service as is presently operated on this bus route.

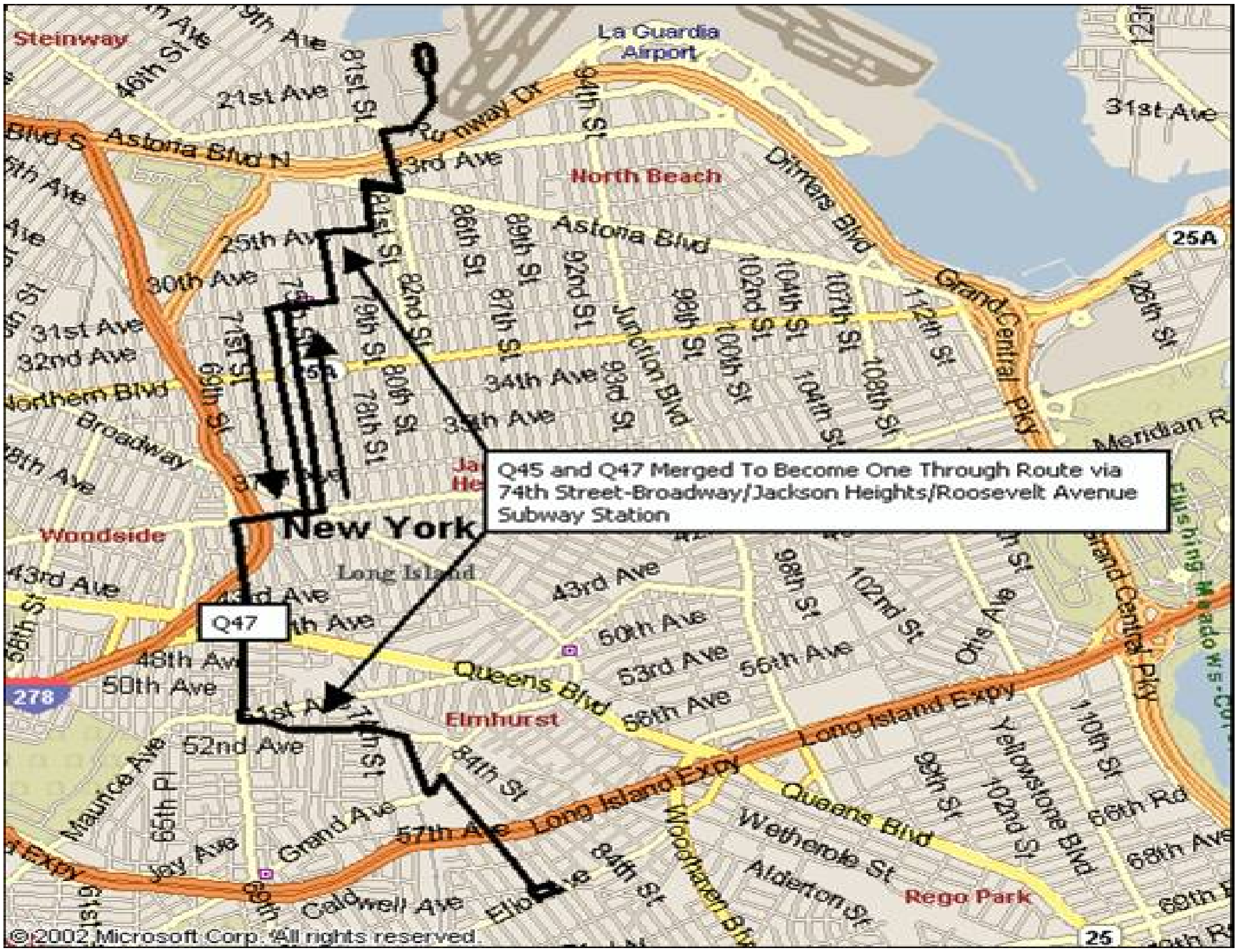
Q45 69th Street and Q47 74th Street

Issues - There are no major issues regarding these two bus routes. However, the opportunity exists to provide passengers in the Juniper Valley area with a one-seat ride to and from LaGuardia Airport's Marine Air Terminal utilizing these two bus routes.

Recommendations - The Q45 and the Q47 bus routes would be through-routed with each other via the 74th Street-Broadway/Jackson Heights/Roosevelt Avenue Subway Station. An advantage of this combination is providing the connections to other Queens bus routes with fewer transfers. As previously mentioned, this would provide passengers in the Juniper Valley area with a one-seat ride to and from LaGuardia Airport's Marine Air Terminal. The newly modified bus route would continue to be called the Q47.

In addition, the current PM weekday peak period short turn variation which operates between the intersection of Astoria Boulevard and 80th Street and the 74th Street-Broadway/Jackson Heights/Roosevelt Avenue Subway Station would continue to be operated, although it would now technically become a short route variation of the basic Q47.

Finally, the modified Q47 (i.e., the combined Q45 and Q47) would operate with the same frequency and span of service as is presently operated on the Q47 bus route.



Q53 Rockaway Park Limited

Issues - This bus route presents an opportunity to rationalize service along the Woodhaven Boulevard corridor, especially with regards to the Q11, Q21 and Q41 bus routes in the Howard Beach, Lindenwood and Rockaway Park communities in southern Queens.

Additionally, it would be desirable for the Q53 to streamline its route alignment near its southern terminal in Rockaway Park.

Finally, some route nomenclature adjustments may be possible for this bus route in order to better reflect the nature of the transit service it provides.

Recommendations - On its southern end, the Q53 would operate via the same alignment currently operated by the Q21 bus route west of Beach 108th Street.

The Q53 would also serve all bus stops along Cross Bay Boulevard south of the Rockaway Boulevard Subway Station in Howard Beach, Lindenwood and Ozone Park, thus providing continuous bi-directional service along Cross Bay Boulevard in place of the discontinued Q21 bus route.

Finally, the Q53 would no longer provide express service along the length of Woodhaven Boulevard south of Rego Park. Instead, the Q53 will serve selected limited service bus stops (i.e., bus stops located only at major transfer points or other significant traffic generators) along this corridor. This will complement and supplement the local bus service to be provided along the Q11 bus route in the same corridor.

To better reflect the type of transit service provided, this bus route would be renamed the Q53LTD.

Q72 Junction Boulevard

Issues - The Q72 is a bus route that may be able to more effectively serve LaGuardia Airport due to its direct approach from the Elmhurst area via Junction Boulevard and 94th Street. It would be desirable to connect the Q72's catchments area with the airport so that passengers in both Elmhurst and Rego Park would have a convenient one-seat ride to and from LaGuardia Airport.

Recommendations - On its northern end the Q72 would be extended to operate into LaGuardia Airport. From 94th Street it would enter the airport directly via the 94th Street bridge (i.e., via the alignment of the Q33 bus route) and then operate through the eastern portion of the airport via the same alignment as the Q33 bus route (i.e., no service would be provided to the Marine Air Terminal). Upon exiting the airport via the 94th Street Bridge, the route would operate southbound on 94th Street and Junction Boulevard to resume its current route alignment.

Finally, the modified Q72 would operate with the same frequency and span of service as is presently operated on this bus route.

2.2 Express Bus Service

General Issues

As was previously mentioned, the express bus routes provide a premium non-stop service and connect a specific area with either one or both of Manhattan's central business districts (i.e., Midtown or Downtown). In Manhattan, the express bus routes circulate along the streets in order to drop-off and pick-up passengers; these routes also circulate throughout specific areas in the

boroughs before and after operating express service to and from Manhattan.

The pattern of operation in Midtown Manhattan differs from that of most of the express bus routes serving the New Jersey suburbs; these express bus routes do not circulate on-street but instead serve the Port Authority Bus Terminal. For the purposes of this plan, it was assumed that Midtown Manhattan express bus service would continue to circulate on-street and would not operate into the Port Authority Bus Terminal.

Route Identification - Presently, in a manner similar to the situation for the local bus routes, there exists a general inconsistency among the various operators as to how express bus routes are named. We have presented an illustrative route nomenclature system which could reduce the level of confusion regarding the various express bus routes and their destinations. This system is as follows:

- Express bus routes will continue to be identified by the alpha-numeric combination familiar to most current users of the system where letters indicate the boroughs of operation and are followed by a route number (e.g., QM15). With this system, the originating borough's initials (e.g., "B" for Brooklyn, "Q" for Queens, "Bx" for The Bronx, etc.) always precede the "M" for Manhattan.

  The express bus designation system employed by New York City Transit differs from that utilized by the privately operated express bus routes franchised by NYCDOT. The alpha-numeric system utilized by New York City Transit has an "X" prefix followed by a route number. From a quick glance at a bus route number, it would not be apparent which boroughs are being served. Obviously, this is not an issue in an express bus route's collection/distribution area; however, this could be a cause for concern on the crowded streets of Manhattan.

  At some point in the future, the route nomenclature system for New York City Transit's express bus routes should be consistent with that utilized by the NYCDOT-franchised operators in order to provide uniformity throughout the city. Presently, the local bus routes share a similar route nomenclature system and thus present a clear and consistent image of the surface transit system to the user; the same should be true of the express bus route system.

- The numerical portion of an express bus route's designation will be determined by the neighborhood (i.e., collection/distribution area) served by that bus route. If a significantly different route alignment path is utilized in the residential neighborhood, or if an entirely different neighborhood is served, then another express bus route number will be utilized.

However, if a different originating borough route alignment path is actually just a short turn or short route variation of the basic express bus route then the variation will also utilize the designation of the basic express bus route as long as the short turn point (or points) are located along the same basic route alignment path. These trips will instead be identified on the vehicles' destination signs by a letter suffix. For example, the BxM2's current basic northbound route would be indicated on the bus destination signs as *"BxM2 – Riverdale"* while the current northbound short turn trips would be indicated as *"BxM2A - Independence Avenue/Riverdale"*.

Letter suffixes would start with "A" for the first route variation and move through the alphabet (i.e., "B" for the second variation, "C" for the third, etc.) although the basic primary or "home" bus route would not have a suffix added to its name. However, there are two exceptions to this rule:

The letters "W", "E" and "D" are specifically reserved to designate what an express bus route does in Manhattan, but only if that route operates more than a single route variation in Manhattan. Express bus routes serving the West Side (i.e., Sixth Avenue) would receive a "W" suffix, those serving the East Side (i.e., Third Avenue) would receive an "E" suffix and those serving Downtown would receive a "D" suffix.

Finally, the letter "X" would not be utilized so as to avoid confusion with the express versions of local intraborough bus routes.

As with the local bus routes, the express bus nomenclature conventions have been utilized in the service recommendations to illustrate their application.

Route Issues and Recommendations

Express Bus Route Issues - There were no major issues regarding overcrowding on the express bus route system. For this reason, the following section simply reviews the recommendations for each express bus route. Unless specifically stated otherwise, express bus routes would operate with the same frequency and span of service as are presently operated. The concluding section presents new express bus service initiatives.

Green Bus Lines

QM15 Lindenwood Express

During the off-peak periods, both the QM15 and the BQM1 express bus routes would be combined. The new off-peak express bus route would utilize a BQM2 designation to better indicate that it would operate via a significantly different route alignment than the BQM1. This modification would allow for a more effective use of midday express bus resources in this portion of Queens and Brooklyn. The BQM1 is operated by Command Bus Company.

In the Rego Park area, the QM15 would no longer operate via 63rd Drive and would instead utilize Woodhaven Boulevard to more directly access the Queens Center area.

Finally, in order to provide additional express bus service in this area of South Ozone Park in Queens, the QM15 would operate in revenue service both to and from the Rockaway Boulevard bus depot.

QM16 Rockaway Park Express
QM17 Far Rockaway Express
QM18 Lefferts Express

There are no changes proposed for these bus routes.

QM23 Brooklyn Manor Express

Similar to the QM15, the QM23 would no longer operate via 63rd Drive and would instead utilize Woodhaven Boulevard in Rego Park to more directly access the Queens Center area.

Jamaica Buses

QM21 Rochdale Village Express

The current AM peak period short turn at Queens Borough Hall would no longer be operated; ridership on the QM21 does not justify the additional capacity provided by this short turn.

However, Saturday service and weekday midday service would be operated on the QM21 bus route. Service would operate hourly approximately between 7:00AM and 9:00PM. It was felt the opportunity to connect Rochdale Village with Manhattan on Saturdays and weekday midday was a viable use of express bus resources.

Queens Surface Corporation

QM1 Fresh Meadows Express

Only route nomenclature adjustments are suggested for this bus route. Sixth Avenue service would be called the QM1W, Third Avenue service would be called the QM1E and Downtown service would be called the QM1D.

QM1A Glen Oaks/Union Turnpike Express

Only route nomenclature adjustments are suggested for this bus route. However, this express bus route serves two different areas of eastern Queens that also differ from the area served by the QM1. Therefore, Glen Oaks-Sixth Avenue service would be called the QM5W, Glen Oaks-Third Avenue service would be called the QM5E and Glen Oaks-Downtown service would be called the QM5D.

Finally, North Shore Towers-Sixth Avenue service would be called the QM6W, North Shore Towers-Third Avenue service would be called the QM6E and North Shore Towers-Downtown service would be called the QM6D.

QM2 Bayside Express

Only route nomenclature adjustments are suggested for this bus route. Sixth Avenue service would be called the QM2W and Third Avenue service would be called the QM2E.

QM2A Clearview Express

This express bus route serves an area of eastern Queens that differs from the area served by the QM2. Therefore, this express bus route would be called the QM7.

QM3 Deepdale/Douglaston Express

There are no changes proposed for this bus route.

QM4 Jewel Avenue Express

Only route nomenclature adjustments are suggested for this bus route. Sixth Avenue service would be called the QM4W and Third Avenue service would be called the QM4E.

Triboro Coach Corporation

QM10 Lefrak City Express (Midtown)

Only route nomenclature adjustments are suggested for this bus route. Sixth Avenue service would be called the QM10W and Third Avenue service would be called the QM10E. The QM10 and QM11 should utilize the same bus stops.

QM11 Lefrak City Express (Downtown)

The QM10 and QM11 should utilize the same bus stops.

QM12 Forest Hills Express

Only route nomenclature adjustments are suggested for this bus route. Sixth Avenue service would be called the QM12W and Third Avenue service would be called the QM12E.

QM22 Jackson Heights Express

Only route nomenclature adjustments are suggested for this bus route. Sixth Avenue service would be called the QM22W and Third Avenue service would be called the QM22E. Another possible service change would be to eliminate the operation of this route along 21st Avenue, continuing the service along Ditmars Boulevard.

QM24 Glendale Express

On the West Side of Manhattan, this express bus route would utilize Sixth Avenue and would no longer operate via Eighth Avenue. This modification would make the QM24's Manhattan route alignment consistent with that operated by all of the other Triboro Coach Corporation express bus routes.

In addition, route nomenclature adjustments are also suggested for this bus route. The new Sixth Avenue service would be called the QM24W, Third Avenue service would be called the QM24E and Downtown service would be called the QM24D.

Finally, weekday midday and Saturday service would be operated on the QM24W bus route. Service would operate hourly approximately between 7:00AM and 9:00PM. It was felt the opportunity to connect Ridgewood with Manhattan on weekday midday and Saturdays was a viable use of express bus resources.

Liberty Lines Express

BxM1 Riverdale-East Side Express
BxM2 Riverdale-West Side Express
BxM18 Riverdale-Downtown (via Midtown) Express

Although these three express bus routes all connect Riverdale in The Bronx with different parts of Manhattan, they would maintain their current route designations because they each approach Midtown Manhattan, the Upper East Side and the Upper West Side with "open door" service via significantly different route alignments.

The short turn service via Independence Avenue on the BxM1 would be renamed the BxM1A and the short turn service via Independence Avenue on the BxM2 would be renamed the BxM2A.

BxM3 Sedgwick Avenue Express

Only route nomenclature adjustments are suggested for this bus route. The short turn service via Van Cortlandt Park would be renamed the BxM3A.

BxM4A Grand Concourse-Van Cortlandt Park Express

Only route nomenclature adjustments are suggested for this bus route. This express bus route would simply be called the BxM4.

BxM4B Grand Concourse-Woodlawn Express

Only route nomenclature adjustments are suggested for this bus route. This express bus route serves a northern area of The Bronx that differs from the area served by the renamed BxM4 and would therefore simply be called the BxM5.

BxM11 White Plains Road Express

Only route nomenclature adjustments are suggested for this bus route. The short turn service via Pelham Parkway would be renamed the BxM11A.

New York Bus Service

BxM6 Parkchester Express

There are no changes proposed for this bus route.

BxM7 Co-op City Express

Only route nomenclature adjustments are suggested for this bus route. The short turn service via the Bellamy Loop would be renamed the BxM7A.

BxM7A Pelham Bay Express

Only route nomenclature adjustments are suggested for this bus route. This express bus route serves a northeastern area of The Bronx that differs from the area served by the BxM7 and would therefore simply be called the BxM12.

BxM7B City Island Express

Only route nomenclature adjustments are suggested for this bus route. Once again, this express bus route serves a northeastern area of The Bronx that differs from the area served by the BxM7 and would therefore simply be called the BxM13.

BxM9 Throgs Neck Express

There are no changes proposed for this bus route.

BxM10 Morris Park Express

There are no changes proposed for this bus route.

New Express Bus Service Initiatives

QM25 College Point Express

This new express bus route would only operate during the AM and PM weekday peak periods between the College Point community in Queens and the West Side of Midtown Manhattan. College Point presently has no express bus service connecting it with Manhattan; in addition, this community does not have easy access to subway or Long Island Rail Road service to and from Manhattan.

In Manhattan - and as far east as the intersection of Northern and College Point Boulevards - the QM25 will operate via the route alignment of the QM3. However, service along College Point Boulevard would make all local stops along that street. The QM25 will utilize the same turnaround loop as that currently utilized by the Q25 local bus route.

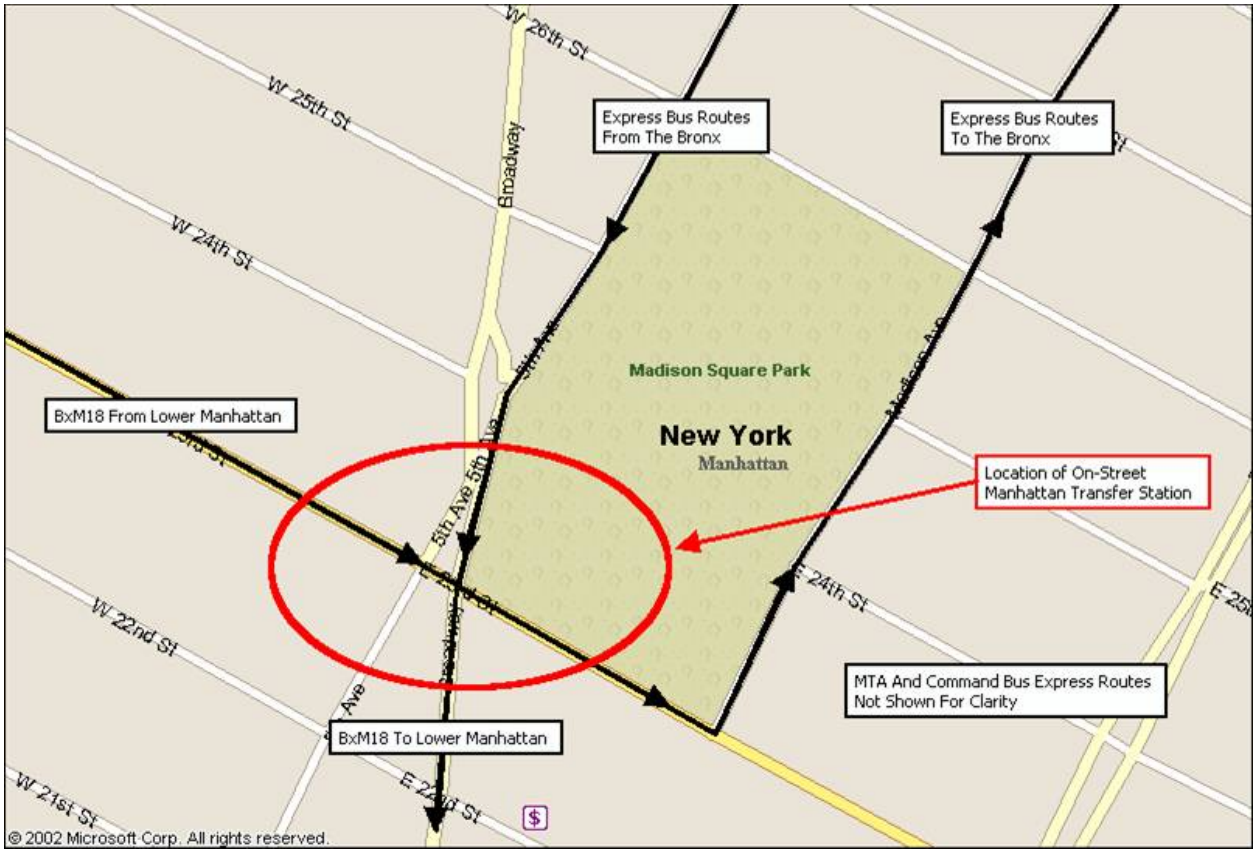
New Transfer Stations

Another new concept is to operate two new transfer stations where several express bus routes can meet at the same time in order to allow passengers to quickly and conveniently transfer to one of the express bus routes serving Lower Manhattan. One new transfer station would be located in Queens, while the other would be located in Manhattan but would be intended to serve the express bus routes to and from The Bronx.

Although the transfer stations would be located on-street, it is intended that the level of passenger amenities (e.g., waiting shelters with benches, public information systems, etc.) would be relatively high. As the service plan moves forward to implementation, physical planning activities would be initiated to determine how many buses could be accommodated at each location.

- **Manhattan Transfer Station** - The Manhattan transfer station would be located in the Flatiron District at an on-street location along 23rd Street near Madison Square Park. This is the point at which the express bus routes from The Bronx that serve Midtown turn around from southbound Fifth Avenue to northbound Madison Avenue. At this location, passengers could transfer to and from the BxM18, which serves Downtown Manhattan. Other express bus routes operated by New York City Transit and Command Bus Company also serve this location.

  Express bus schedules would require some adjustments so that as many routes as practical serve the 23rd Street area at approximately the same time, thus minimizing the amount of waiting time experienced by passengers. Increased coordination and communication between companies would be required.



- **Queens Transfer Station** - The Queens transfer station would actually consist of three different on-street boarding locations. The first two would be utilized during the AM peak period; the third would be utilized during the PM peak period. Buses should not incur significant time penalties in order to serve the new stops.

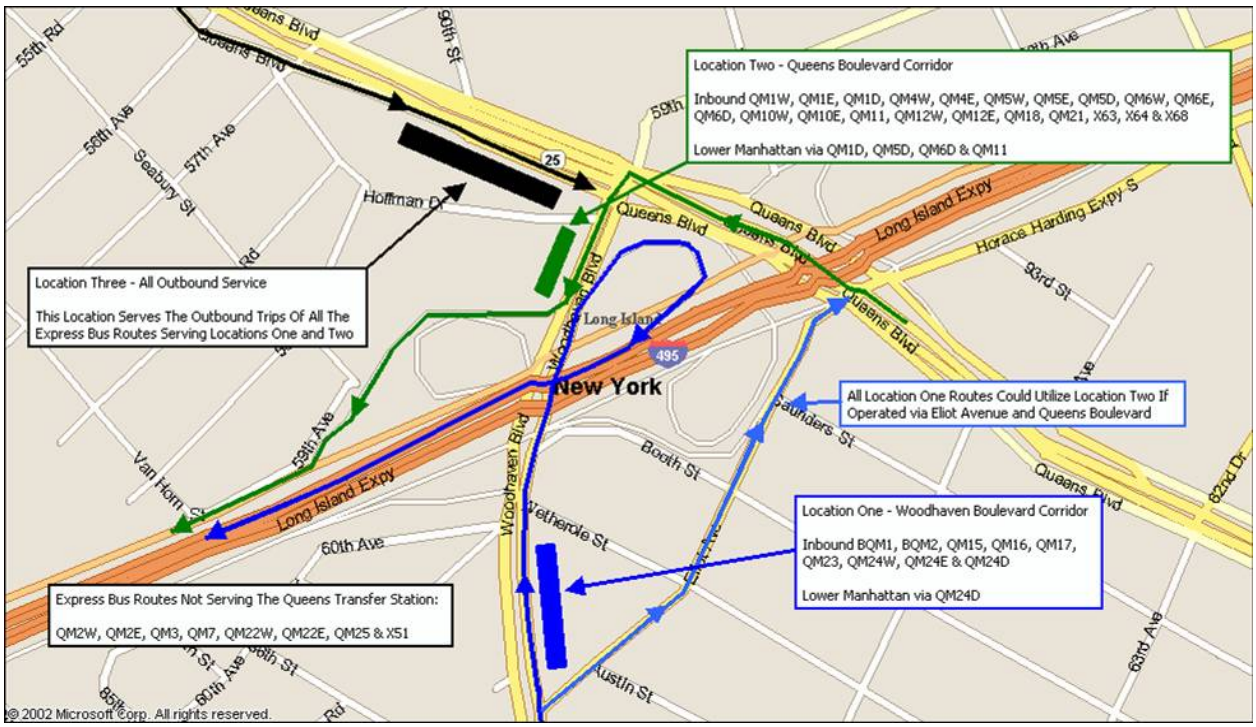
  The first would be located on northbound Woodhaven Boulevard, just north of the Long Island Rail Road overpass. This location would serve many of the express bus routes operating via the Woodhaven Boulevard corridor. The express bus routes serving this location would include the BQM1, the proposed BQM2, QM15, QM16, QM17, QM23 and the QM24 (the proposed QM24W, QM24E and QM24D). Service to Downtown Manhattan would be provided via the QM24D, which operates every 20 minutes. It is possible that additional service to and from Downtown would be required. If this were the case, then either additional service would be operated on the QM24D, or a new express bus route would be created operating solely between the Queens transfer station and Downtown Manhattan.

The second portion of the Queens transfer station would be located on southbound Woodhaven Boulevard just north of the entrance ramp to the Long Island Expressway, near Hoffman Drive. This location would serve many of the express bus routes operating via the Queens Boulevard corridor. The QM10 (the proposed QM10W and QM10E) and the QM11 would be re-routed off of Hoffman Drive and onto Queens Boulevard in order to serve this location. The express bus routes serving this location would include the QM1 (the proposed QM1W, QM1E and QM1D), QM1A (the proposed QM5W, QM5E, QM5D, QM6W, QM6E and QM6D), QM4 (the proposed QM4W and QM4E), QM10 (the proposed QM10W and QM10E), QM11, QM12 (the proposed QM12W and QM12E), QM18, QM21, X63, X64 and X68. Frequent service to Downtown Manhattan would be provided via the QM1D, QM5D, QM6D and QM11.

It is also possible to allow all of the Woodhaven Boulevard corridor express bus routes serving the first location to instead serve the second location by re-routing them from northbound Woodhaven Boulevard to northbound Eliot Avenue, westbound Queens Boulevard and southbound Woodhaven Boulevard to the Hoffman Drive location.

The third location would serve all of the previously mentioned express bus routes during the PM peak period (i.e., outbound from Manhattan). This location would be along eastbound Queens Boulevard opposite the Queens Center Mall, just east of 57th Avenue.

The express bus routes that could not be accommodated at the Queens Transfer Station were the QM2 (the proposed QM2W and QM2E), QM2A (the proposed QM7), QM3, QM22 (the proposed QM22W and QM22E), the proposed QM25 and the X51.


Location Two - Queens Boulevard Corridor
Inbound QM1W, QM1E, QM1D, QM4W, QM4E, QM5W, QM5E, QM5D, QM6W, QM6E, QM6D, QM10W, QM10E, QM11, QM12W, QM12E, QM18, QM21, X63, X64 & X68
Lower Manhattan via QM1D, QM5D, QM6D & QM11
Location Three - All Outbound Service
This Location Serves The Outbound Trips Of All The Express Bus Routes Serving Locations One and Two
All Location One Routes Could Utilize Location Two If Operated via Eliot Avenue and Queens Boulevard
Location One - Woodhaven Boulevard Corridor
Inbound BQM1, BQM2, QM15, QM16, QM17, QM23, QM24W, QM24E & QM24D
Lower Manhattan via QM24D
Express Bus Routes Not Serving The Queens Transfer Station:
QM2W, QM2E, QM3, QM7, QM22W, QM22E, QM25 & X51
New York
Long Island Expy
Queens Blvd
Woodhaven Blvd
Hoffman Dr
Seabury St
56th Ave
57th Ave
59th Ave
60th Ave
Van Horn St
Wetherole St
Booth St
Saunders St
Austin St
Horace Harding Expy S
93rd St
63rd Ave
62nd Dr
55th Rd
90th St
59th
25
495
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Chapter 3 Summary

This technical memorandum presents a comprehensive and detailed program of service improvements. It includes changes to existing bus routes as well as proposals for entirely new bus lines. The plan includes changes to route alignments, headways, span and nomenclature. Combined, the proposals afford patrons more convenient and attractive bus service.

Section 3

Service Guidelines

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Chapter 1 Introduction

A series of service standards - or service guidelines - has been developed for the privately operated local and express bus routes in Queens, The Bronx and Manhattan that are franchised and supported by the New York City Department of Transportation (NYCDOT). These guidelines assist in evaluating the adequacy of existing services as well as in developing new service proposals.

The service guidelines presented in this section were derived from several sources. These include the *NYCDOT Local and Express Bus Service Planning Guidelines* draft report prepared in February of 2002, various documents prepared by the New York City Transit Authority and the prior work experience of the consultant team in large metropolitan areas.

Also considered was research results presented in the Transit Capacity and Quality of Service Manual (TCQSM). One concern with this document is the number of measures described, as well as the resources necessary to assemble data to evaluate routes. Since the applications of the guidelines should be consistent with available agency and carrier resources, the TCQSM was used more as a reference. The standards that are suggested for use in the current route planning assignment focus on several areas of concern such as on-time performance, overcrowding, and productivity.

It should be recognized that the service guidelines presented in this report are only one input to the planning process. Other issues, such as equity and need for bus service, will also influence transit decisions.

Service guidelines are used by transit systems for several purposes:

- To define community expectations for public transportation service.
- To establish minimum thresholds for providing transit service.
- To establish performance targets for existing services.
- To provide an objective framework to asses the balance of supply and demand.

Service guidelines can be used both to evaluate existing services and to design new services. Existing services would be reviewed using service guidelines to determine how the system as a whole performs and how well individual routes perform. For example, the system may have a farebox recovery ratio of 75 percent but individual routes may have performance ranging from 40 to 90 percent. In planning new services, the service guidelines become a set of warrants to determine if new services are justified or more service is needed on existing routes.

There are two types of service guidelines: design guidelines and performance guidelines. Service design guidelines cover the basic considerations in designing a public transportation system and are similar to warrants for traffic control, while performance guidelines reflect the results achieved in actual operation and are used to measure how efficient and effective existing services are. It should be recognized that the latter type of guidelines can also influence route planning decisions. Two

concluding points regarding this memorandum should be kept in mind. First, the guidelines are not absolutes that must be met in all instances. Rather, they provide guidance in assessing current bus service and in planning future bus service. Second, they help to point out the tradeoffs between the benefits of transit service and the cost of providing that service.

This section introduces the comprehensive set of service guidelines that has been developed for the NYCDOT franchise bus operators. As previously mentioned, the discussion will follow the two basic categories: service design guidelines and performance guidelines.

For purposes of the current analysis, there are two types of bus routes franchised by NYCDOT: local bus routes and express bus routes. The local bus routes typically operate wholly within a specific borough, and connect certain commercial corridors or residential neighborhoods with each other as well as with the subway system. Local arterial routes tend to operate along certain major streets and form the basis of a grid system, while local feeder routes tend to connect a specific neighborhood with a major transit hub, commercial generator or subway station. The express bus routes provide a premium non-stop service and connect a specific area with either one or both of Manhattan's central business districts (i.e., Midtown or Downtown). Unless stated otherwise, the service guidelines apply to all of the various types of bus routes.

Chapter 2 Service Design Guidelines

A total of nine different guidelines have been defined for this category. All deal with how the transit system is or should be designed to meet community expectations for mobility. Service design guidelines have been developed for the following nine areas:

- Service Availability
- Bus Stop Spacing
- Span of Service
- Frequency
- Directness
- Route Branching/Turnbacks
- Bus Shelter Locations
- Bus Stop Information
- Public Information

The following discussion explains the concept behind each design guideline as well as the suggested threshold or target value that is defined for the NYCDOT franchise bus operators.

Service Availability - The NYCDOT receives requests for service from citizens who want bus service to a location that is not presently served. Either someone is not within walking distance of a bus route, or the bus does not go where they want it to go. Since transit resources are limited, it is important to establish guidelines to serve as minimum thresholds or warrants for service. These can be used in deciding how to allocate existing resources to expand service to new locations or rationalize service that is already in place.

The service availability design guidelines for the NYCDOT franchise bus operators described in this section of the technical memorandum apply only to the local bus routes and are grouped into two categories: the "production end" and the "attraction end". The production end relates to residential land use, while the attraction end reflects non-residential land uses.

- Production End - Typically in the transit industry, local bus service is considered "available" if it is within 1/4 mile (i.e., about a five minute walk) of the population in a particular area. This is viewed as the maximum reasonable distance that someone should be expected to walk to access a bus stop in an urban area. This represents a "rule of thumb" which needs to be adjusted to site specific conditions.

  The walking distance to a local bus stop in residential areas should depend on two factors: population density and transit dependency. Transit works best and is most

productive where densities are greatest. Transit dependent areas, as measured by a low number of vehicles per household, are likely to be areas with lower income levels and with a greater need and propensity to ride transit.

Areas with both a relatively higher population density as well as a relatively higher number of households either without access to a private vehicle or with only one car in the household warrant more local bus service (i.e., shorter walking distances to the nearest bus stop). This service design guideline is summarized in the accompanying table, Table 2-1.

Table 2-1: Maximum Walking Distance To Nearest Bus Stop

Vehicles per Household	Population Density (Persons per Acre)		
	Over 100	**26 to 99**	**Under 25**
Under 0.40	1/4 mile	1/4 mile	3/8 mile
0.41 to 0.99	1/4 mile	3/8 mile	2 mile
Over 1.00	3/8 mile	2 mile	1 mile

The values presented for route spacing above are based on information for New York City from the 2000 US Census. This exhibit also indicates route spacing appropriate for a given density and automobile ownership rate. For example, in areas of greatest need (i.e., the highest density and lowest automobile ownership) bus routes would be spaced at half-mile intervals. Local bus service to other areas with either lower population densities or less transit dependency should be provided as resources permit, particularly for reasons of maintaining system connectivity.

- Attraction End - The primary mission of a transit system is to provide access to key destinations within the community. The following service design guidelines provide a threshold for determining if a particular generator is large enough to warrant local bus service. Guidelines have been defined for employers, health care centers, schools and colleges, shopping centers, transportation facilities, and community facilities. In some cases, a particular generator may qualify for service in more than one category (e.g., a health center that employs 500 or more employees). Service should be provided to all generators that meet and exceed these thresholds. Service to other generators should be provided as resources permit.

- Major Employers - A single location with 500 or more employees should receive local bus service. Similarly, a location where a cluster of employees combines for 500 or more employees should be served by a bus route.

- Health Care Centers - All hospitals, major clinics, and nursing homes with at least 250 beds are candidates for bus service. Service is needed to accommodate employees, patients, and visitors.

- Schools and Colleges - All universities, colleges, and vocational schools should be served if they have 2,500 or more students enrolled.

- Shopping Centers - All malls and shopping plazas with more than 300,000 square feet of retail space should be served.

- Community Facilities - Key locations that attract 300 or more daily visitors should be served. These include Borough Halls and courthouses, offices with a lot of public visitation (e.g., health and human services, employment-related services, etc.) and large recreational facilities.

A generator is considered served if the bus stops on the property or within 1/4 mile of the main entrance. It is important to consider pedestrian safety and physical boundaries to assure that the walk from the bus stop is within 1/4 mile, or about 1,300 feet, and not hazardous.

Finally, to the extent possible, riders should be afforded access to key subway stations. This qualitative service design guideline recognizes that certain major subway stations are more important than others. For example, some stations offer access to several local and express subway lines which may serve different parts of Manhattan as opposed to subway stations which are served by a single local line. When reasonable, service to these key subway stations should be provided so that the number of transfers passengers must make is minimized.

As previously mentioned, these service availability guidelines apply to the local bus routes. There are no quantitative guidelines in terms of service availability for the express bus routes. The express bus routes provide direct linkages between certain neighborhoods in the outer boroughs and one or both of the Manhattan central business districts. Because they eliminate the need to transfer between local bus routes and the subway for certain trips, there is a dedicated ridership base for this type of service.

Bus Stop Spacing - Related to service availability - and to having service near one's origin - is where the bus stop is located. This service design guideline addresses the tradeoff between accessibility and speed. Bus stops at relatively close spacing would reduce speed, while wide spacing would reduce access and system availability. Throughout the NYCDOT franchise bus operators' service area, bus stops should be positioned approximately every three city blocks, or about every 750 feet. Also, there should be a stop at every major activity center (the commercial destinations described above as warranting service). Of course, the exact placement of a bus stop should be based on pedestrian safety, convenience, transit operations, and traffic engineering considerations.

Span of Service - This guideline establishes the minimum hours of the day that a particular bus service operates. Of course, if demand warrants service would be operated for a longer period of time. For the NYCDOT franchise bus operators, the guidelines are summarized in the accompanying table 2-2.

Table 2-2: Minimum Span of Service Guidelines

Service Type	Weekday	Saturday	Sunday
Local - Arterial	6:00AM to 12:00AM	7:00AM to 12:00AM	8:00AM to 12:00AM
Local - Feeder	6:00AM to 9:00PM	7:00AM to 9:00PM	8:00AM to 9:00PM
Express	6:00AM to 9:00AM 4:00PM to 7:00PM	--	--

As noted previously, the guidelines represent minimum acceptable thresholds for service. For example, demand along a particular route could suggest express bus service during the midday period and on weekends.

Frequency - This service design guideline is particularly important from the passenger's perspective. The frequency - or headway - is the time from one bus to the next on a certain bus route at the same location along the route. Frequencies typically are established to provide enough vehicles to accommodate the passenger volume. Where passenger volume is not an issue, the frequency is based on policy. Whenever feasible, it is preferable to have bus routes operate at frequencies where all headways are divisible by the same unit (e.g., 30 and 60 minutes) so that it is easier to facilitate transfers among connecting bus routes at major transit hubs. The accompanying table, Table 2-3, summarizes the minimum headways for the NYCDOT franchise bus operators.

Table 2-3: Minimum Frequency of Service Guidelines (Headway in Minutes)

Service Type	Weekday				Weekend		
	Peak	Midday	Evening	Owl	Base	Evening	Owl
Local - Arterial	20	30	30	60	30	60	60
Local – Feeder	30	60	60	--	60	60	--
Express	2 trips	--	--	--	--	--	--

Directness - The directness service design guideline recognizes that there are trade-offs between providing service in close proximity to all key origins and destinations and the most direct and efficient route between any two locations which an automobile would operate. In order to provide convenient access, it is sometimes necessary to route buses off of major streets. This guideline establishes the maximum deviation that should be allowed, or the extent that a route should be permitted to be circuitous. To determine this guideline, it is necessary to know two numbers: the total length of a particular bus route and the most direct distance between the two ends of the route as an automobile would operate between them.

For the local bus routes, the guideline is that no route should have a ratio of more than 1.20. That is, no local bus route should be 20 percent longer than the most direct path between the two termini which an automobile would utilize.

For the express bus routes, the guideline is that no route should have a ratio of more than 1.25. That is, no express bus route should be 25 percent longer than the most direct path between the two termini which an automobile would utilize. The larger ratio for express buses is consistent with previous NYCDOT standards and may reflect circulation patterns in Manhattan.

Route Branching/Turnbacks - To minimize the level of confusion for the passengers, as well as to make the transit system easily comprehensible to both regular and occasional riders, both local and express bus routes should be simple and straightforward, with as few variations as possible. Both local and express bus routes should therefore have no more than three branches, preferably fewer.

While no maximum quantity is specified in terms of turnbacks or short turns, the number of these should be kept to a minimum along any single bus route. However, it is recognized that the NYCDOT franchise bus operators frequently utilize short turns to enhance peak period capacity along heavily utilized segments of a bus route.

Bus Shelter Locations - A major concern of transit riders, especially during inclement weather, is the amount of time spent on the street exposed to the elements. There is a need for protection from precipitation, wind and strong sunlight.

The placement of bus passenger waiting shelters and the development of a priority location program should be based on the number of boarding and/or transferring passengers at a specific bus stop, as well as on the frequency of bus service at that bus stop. All else being equal, bus stops with a longer average waiting time between buses warrant a shelter sooner than those with a shorter average waiting time between buses. Shelters should eventually be provided at all bus stops which serve 200 or more boarding and/or transferring passengers during the course of a typical weekday. Locations that meet this guideline should be prioritized as shown on Table 2-4.

In some cases, the need for a shelter will be obviated by the availability of canopies or overhangs projecting from structures adjacent to the bus stop.

Table 2-4: Bus Passenger Waiting Shelter Priority Guide

Daily Boardings	Peak Period Headway (In Minutes)		
	Over 30	10 to 30	Under 10
Over 600	1st	1st	1st
500 to 599	2nd	2nd	2nd
400 to 499	2nd	2nd	3rd
300 to 399	2nd	3rd	3rd
200 to 299	3rd	3rd	3rd

Bus passenger waiting shelters should also be placed at all intermodal transfer stations and at all park-and-ride lots.

Bus passenger waiting shelters should include a minimum of 50 square feet of area and be enclosed on all sides except for entrances and exits. Benches should be provided for the comfort of waiting passengers whenever possible. New shelters should be designed and sited to be consistent with Americans with Disabilities Act (ADA) requirements regarding accessibility. All shelters should include route and schedule information displays.

The guidelines for the shelter placement and design are from the perspective of the rider and providing protection from inclement weather. It is also recognized that bus shelters provide a

revenue source for the system, through shelter advertising, which will also influence location and visibility.

Bus Stop Information - All bus stops should be identified by a bus stop sign which accurately lists all the bus routes and operators serving that stop, their telephone information number and their website address. Stops should be clearly marked as a no parking/ no standing zone except for the bus. Up to date schedule information also should be provided at major stops and transfer points. Stops busy enough to warrant a shelter should also include a panel of transit information.

Public Information - NYCDOT and its franchise bus operators, along with the Metropolitan Transportation Authority, should provide public information for current and potential riders. At a minimum, there should be individual public timetables for all bus routes. The borough bus maps/riders guides should feature the NYCDOT franchise local bus routes along with those operated by MTA New York City Transit (NYCT). In addition to the express bus routes operated by NYCT, the borough bus maps should also incorporate the NYCDOT franchise express bus routes. Finally, a citywide express bus map showing all of the routes provided by all of the operators should also be available and updated regularly.

This information should be available in different formats to accommodate the needs of different rider groups. Accessible formats and alternative languages should be considered. This information should be distributed throughout the service area at major destinations (e.g., at shopping centers such as Queens Center Mall or Bay Plaza). The information also should be available in electronic format on the web site for customers who choose to access it that way. Public transportation information should also be available by telephone from a live operator during service hours.

Chapter 3 Performance Guidelines

A total of five different guidelines have been defined for this category. All deal with how well the NYCDOT franchise bus routes perform "on the street". The emphasis is on rider comfort and the efficiency and effectiveness of these services. Performance guidelines have been developed for the following five areas:

- Service Reliability
- Farebox Recovery Ratio
- Passenger Productivity Levels
- Vehicle Loading
- Vehicle Condition

The following discussion explains the concept behind each performance guideline as well as the actual threshold or target value that is defined for the NYCDOT franchise bus operators. As noted previously, these guidelines also influence service and route planning decisions.

Service Reliability - One of the most critical performance measures is whether the transit service operates as scheduled. The transit rider needs to know that the bus will be there when the published timetable indicates. Unreliable service reduces the attractiveness of transit service, particularly chronic problems with a particular route. Service reliability consists primarily of schedule adherence (i.e., on-time performance).

The first step in defining a schedule adherence guideline is to define on-time. For these performance guidelines, a bus is on-time if it arrives between zero and five minutes after its scheduled time. Buses may operate a few minutes later than the public timetable indicates, but never early.

A minimum percentage of trips which must operate on-time is the typical way in which this guideline is defined. However, the service type, the time of day and the frequency of the bus route also help define the minimum percentage of trips that should operate on-time so that a bus route meets the intent of this performance guideline.

Express bus routes should have a more stringent guideline than local bus routes because of both the time-sensitive nature of the typical commuter trip as well as the fact that express bus routes charge a premium fare. During the off-peak periods, the on-time percentage guideline should be more stringent because of both the fewer transit options that are available at these times as well as the fact that there is less traffic congestion. Finally, bus routes that operate less frequently should operate a higher percentage of their trips on-time because the waiting time between buses is greater. The guidelines for the NYCDOT franchise bus operators are summarized on Table 3-1.

Table 3-1: Minimum Percentage of On-Time Trips

Service Type/Time Period	Headway (In Minutes)		
	Under 10	10 to 30	Over 30
Local - Peak Period	80	85	90
Local - Base Period	85	90	95
Express - Peak Period	90	90	95
Express - Base Period	95	95	95

When headways are less than 5 or 6 minutes, vehicle separation to avoid bunching and platooning is more critical. Under these conditions, the variation in headways is more important than schedule adherence as defined above.

Farebox Recovery - A key measure of financial performance is the percentage of operating costs that are recovered through passenger fares. For this performance measure, passenger fares includes revenue from cash deposited in the farebox, MetroCard revenue and receipts from sales of prepaid passes and tickets.

First, performance is measured at the systemwide level. Overall, the NYCDOT franchise bus system should recover at least 40 percent of its operating expenses with passenger fares. However, the systemwide farebox recovery guideline can vary by service type and day of operation, as shown in the accompanying table, Table 3-2.

Table 3-2: Minimum Systemwide Farebox Recovery Guidelines (Percent)

Service Day	Service Type	
	Local	Express
Weekday	50	30
Saturday	45	45
Sunday	35	40

Next, the farebox recovery guideline measures performance at the route level. Those bus routes whose farebox recovery rate is 75 percent or greater of the appropriate guideline are considered acceptable. Those whose farebox recovery rate is between 50 and 75 percent of the appropriate guideline should be carefully reviewed and possibly modified. Finally, those bus routes whose farebox recovery rate is less than 50 percent of the appropriate guideline should be candidates for major changes to improve their performance or possibly elimination.

Passenger Productivity Levels - Passenger productivity relates the volume of riders to the level of service provided. This guideline measures how many people board a particular bus route while it is available for revenue service. Once again, the guideline first starts with a systemwide average. Overall, the NYCDOT franchise bus system should transport at least 40 passengers per hour. However, the systemwide passenger productivity guideline can vary by service type and day of operation, as shown on Table 3-3.

Table 3-3: Minimum Systemwide Passenger Productivity Guidelines (Passengers Per Hour)

Service Day	Service Type	
	Local	**Express**
Weekday	50	10
Saturday	45	13
Sunday	40	12

Finally, each bus route can be compared relative to the guidelines defined in this table. Those bus routes whose passenger productivity is 75 percent or greater of the appropriate guideline are considered acceptable. Those whose passenger productivity is between 50 and 75 percent of the appropriate guideline should be carefully reviewed and possibly modified. Finally, those bus routes whose passenger productivity is less than 50 percent of the appropriate guideline should be candidates for major changes to improve their performance or possibly elimination.

Vehicle Loading - It is expected that, at various times, local bus routes would have so many passengers aboard that they would no longer have any seats available and that some riders would have to stand for at least a portion of their trip. However, at a certain point, a bus can become uncomfortably overcrowded. When this occurs, the transit service becomes a less attractive mobility option for two reasons. First, overcrowding results in an uncomfortable ride for the patron. Second, overcrowding causes delays to service since boarding and alighting is more time consuming.

The vehicle loading performance guideline translates the point at which a bus becomes overcrowded into a quantifiable threshold by utilizing load factor. Load factor is the ratio of riders on the bus to the number of seats at the maximum load point. The accompanying table, Table 3-4, summarizes this performance guideline.

Table 3-4: Maximum Load Factor Guidelines (Percent)

Service Type	Weekday				Weekend		
	Peak	Base	Evening	Owl	Base	Evening	Owl
Local	140	120	120	120	120	120	120
Express	100	100	100	--	100	100	--

For local routes, some standees are permitted, but no patron should be expected to stand for more than 10 or 15 minutes. If approximately 15 to 20 percent of all trips in any given time period are operating with load factors in excess of those suggested by this guideline, then additional capacity should be provided on the affected bus routes. However, for reasons of safety and comfort, passengers on express bus routes should always expect to find an open seat on the bus. This guideline also recognizes that express bus passengers pay a premium fare and that the travel time is typically longer than for those passengers on a local bus route.

Vehicle Condition - Passengers expect a safe, clean comfortable bus. The performance guidelines for vehicle condition reflect this. Each bus should meet the following minimums when it is in revenue service:

- working heat and air conditioning
- working accessibility features (i.e., lift/ramp, kneeler, etc.)
- clear windows (no dirt, grafitti, or "scratchitti")
- seats intact (not loose or ripped)
- clean interior and exterior

Buses should be attractive. Noise, smoke and odor should be kept to as low a level as possible through use of the latest equipment and strict maintenance procedures. Exteriors of buses used for the all routes should be washed daily. Body damage should be scheduled for immediate repair. Signage, particularly the route designation, should be working, correct and clearly visible.

Chapter 4 Summary

Prudent management of limited transit resources suggests the need for a set of guidelines to assess current service and formulate proposals for the future. They provide a basis to compare the benefits and costs of public transportation from a policy perspective. The guidelines presented here have been utilized, along with other information and analyses, to develop a series of proposed transit improvements.

Section 4

Implementation Plan

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Chapter 1 Introduction

This final section ties all of the previous efforts together by presenting the operation, financial, capital, and implementation plans for the recommendations presented in earlier sections. Presented in the operations and financial chapter are the changes in service statistics for each company based on the route recommendations presented previously. These route recommendations are in turn based on issues identified in the existing conditions and service standards sections. In the capital plan section, a vehicle purchase program is presented in order to expand the fleet and provide necessary fleet replacement, as well as a brief look at each facility to determine the ability of each facility to handle the increased fleet size. A route service implementation plan that indicates the priorities and importance of each proposal is presented in Chapter 4.

Chapter 2 Operations and Financial Impacts

As part of the analysis of the private bus operators, a series of service proposals were formulated and subjected to discussion and comment by study participants. Based on this review, a recommended plan was formulated that included a variety of service improvements. In some cases, the proposals were oriented to remedying current deficiencies (e.g., relieve overcrowding) while others exploited opportunities (e.g., provide a one-seat ride). The next step in the process is to estimate the impacts of these changes in terms of key operating, ridership and financial statistics. Also, fleet requirements in terms of replacement and expansion need to be specified. This section presents the methodology and results of this forecasting process.

2.1 Analysis Framework

At the outset, certain decisions were made regarding the recommended plan and the manner of gauging its impact. Each of these are summarized below:

- A two-tier approach was taken in formulating proposals which recognized necessary lead time and policy issues. Many of the proposals could be implemented with either standard buses (i.e., 40 feet in length) or articulated coaches. Following a more conservative approach regarding fleet policies, the forecasts were based on standard buses. It is recognized that certain economies might be possible with higher capacity equipment.

- In a similar manner, certain proposals would require greater integration of service between the franchised carriers and MTA-NYCT. In the current analysis, it is assumed that these types of changes would not be reflected in the forecasts, although they have been documented.

- Two conditions have been delineated in the current analysis. The first is referred to as the base, which is representative of current operations at the time the survey program was undertaken (Fall, 2002) and representative of data compiled for 2001 which includes the National Transit Database submission to the Federal Transit Administration and the 17A forms to the New York State Department of Transportation. Both forms include a wealth of information on systemwide operating statistics, ridership, costs and revenue. The second condition is the increment in key statistics with implementation of study recommendations. Combined with the base condition, this represents the forecast impacts of the plan with future implementation.

- Since most of the proposals involve changes to existing bus routes, the base condition also included detailed information on each bus route. This route level performance for each service day and an entire year was based on the survey results (Fall, 2002) and operator provided data. The route level analysis was performed for each service day (i.e., weekday, Saturday and Sunday) and comprised a timely input to the formulation of service proposals and service guidelines. The data base includes estimates of current

vehicle hours, vehicle miles, peak vehicles, ridership, revenue and operating costs along with numerous performance measures such as farebox recovery and boardings per hour.

- The forecasts of impacts are based on implementation of all study proposals within a five year horizon period. This reflects the nature of the proposals as well as the uncertainty on funding for the current bus system and its expansion. It is recognized that certain proposals which call for remedying current problems would have a relatively high priority.

- All financial forecasts of operating costs and revenues are presented in 2001 dollars. This reflects the application of cost models that were calibrated utilizing 2001 data. Farebox revenue reflects the current fare structure and survey results of about two years ago. To the extent operating costs escalate and fare programs are revised, the forecasts would have to be adjusted accordingly.

The discussion above is helpful in understanding the key assumptions and framework for the analysis. The remainder of this section presents a description of the procedures and the results with full implementation of the plan.

2.2 Procedures

The impact of the recommended service plan was estimated for key operating, ridership and financial statistics. In all cases, the values estimated were the change or increment in key measures. This was readily accomplished for existing routes that were modified where a route level database was compiled for each bus line. For new routes, the increment corresponded to the value estimated with the new bus line. Separate estimates were prepared for each service day. By multiplying the daily forecasts by the number of days, annual estimates were quantified.

The forecasts were prepared for each service proposal, summed by operator and then combined for the entire system. It should be recognized that the forecasts presented here are order of magnitude estimates that would be refined as the plan moves toward implementation. A brief summary of how each statistic was estimated is presented below.

- **Vehicle hours** - Because of the labor intensive nature of public transportation with a major portion of costs associated with drivers' wages and fringe benefits, this is an important statistic to estimate. By examining the current buses in service by time period, forecasts of future requirements were estimated based on distance traveled and operating speeds along with consideration given to running and cycle times. As noted above, this process was repeated for each service day where changes were recommended.

- **Vehicle miles** - This statistic was estimated based on the number of vehicle hours and reasonable estimates of operating speeds. The description of current service included estimates of this operating statistic by service day which represented the base condition.

The increment in service levels was estimated for each route modification as well as for the few entirely new routes that were proposed.

- **Peak vehicles** - Similar to the vehicle hours and vehicle miles forecasts, estimates of the change in vehicle requirements were also prepared. Determination of this value was based on consideration of cycle times and headways. Of particular importance is the number of vehicles in service during the weekday peak period. These estimates form the basis for bus fleet requirements and purchases.

- **Operating costs** - As part of the analysis of the current bus system, a cost allocation model was quantified for each operator based on 2001 cost experience. The model relates the cost of providing bus service to three variables – vehicle hours, vehicle miles and peak vehicles. Initially the model is used to estimate the cost of each existing bus line. This represents the base condition for each bus route. To estimate the cost impact, the incremental change in vehicle hours and vehicle miles was multiplied by the appropriate unit costs of the cost allocation model. The peak vehicle unit cost (i.e., third variable) is not used in the forecasting process since it includes fixed operating expenditures which would not change with relatively small scale service changes.

  Another point regarding the cost estimates is that use of the costing model results in an average costing approach which is consistent with the objective of the current analysis to develop order of magnitude estimates. It is recognized that as the plan moves toward implementation, estimates of operating statistics and costs will be refined, ultimately through a scheduling exercise.

- **Ridership** - For each bus route and service day, boardings were available which represented the base condition. Changes in ridership with the service proposals were based on application of a simplified elasticity approach. In the current analysis, an elasticity value of 0.50 was assumed. For example, a ten percent increase in service levels (e.g., vehicle hours) would result in ridership gains of half this value, or five percent. The elasticity value was used in situations where service was increased or reduced. For new routes, an assumed productivity value was applied based on similar experience with the existing system.

- **Revenue** - As part of its system monitoring activities, ridership by fare category (e.g., adult, seniors, cash and Metro Card) was tabulated for each bus route. The data was for a representative month and reflected the current fare structure with Metro Card and free transferring. Based on this survey data, an average fare value was computed for each route. In turn, this value was multiplied by the change in ridership to gauge the revenue impact.

The discussion above provides a brief summary of how the various statistics were computed. They provide a reasonable basis to assess the implication of the service changes.

2.3 Operating Forecasts

As noted above, the forecasts were based on a three-step process of (1) establishing the base condition, (2) estimating the incremental change and (3) summing the results to establish the magnitude of the bus system with implementation of the recommended plan. While the forecasts were prepared for each bus route, for simplicity, all forecasts have been presented by carrier. A summary of the forecasts for the six transit operators combined is presented below on Table 2-1. Route level statistics are presented in Appendix H.

Table 2-1: Operations Statistic Summary

Statistic	Base	Increment	Forecast	Percent Change
Vehicle Hours (000's)	2,845	411	3,256	14.4
Vehicle Miles (000's)	28,361	2,912	31,273	10.3
Peak Vehicles	974	154	1,128	15.8
Ridership (000's)	114,925	10,041	124,966	8.7
Operating Costs ($000's)	265,474	33,394	298,868	12.6
Revenue ($000's)	107,206	8,232	115,438	7.7
Deficit ($000's)	158,268	25,162	183,430	15.9

It should be noted that two of the carriers - Liberty Lines Express and New York Bus Service - are not recommended for significant changes in their operations. For this reason, all impacts are associated with the other four carriers that were analyzed – Green Bus Lines, Jamaica Buses, Queens Surface Corporation and Triboro Coach Corporation.

While differences are noted for each operating statistic, the recommended plan represents approximately a one-sixth increase in service levels. Much of the service expansion is oriented to relieving overcrowding during peak periods which accounts for a somewhat greater increase in peak vehicles than either vehicle hours or vehicle miles. The difference between vehicle hours and vehicle miles suggest expansion of service levels on more heavily utilized bus routes in more densely developed areas where operating speeds are lower.

Because cost allocation models were utilized to estimate the change in operating costs, the increases in expenditures are similar to those for the operating statistics. Using a conservative approach, ridership levels are not expected to increase at the same rate as the various operating statistics. In turn, revenues are not expected to keep pace with the increase in operating expenditures. The consequences of costs rising faster than revenue is that the deficit will increase by 15.9 percent. As noted previously, the financial forecasts are based on conservative assumptions that may tend to over-estimate costs and under-estimate farebox revenue. Further, all financial estimates are in 2001 dollars. To the extent costs increase and fares are modified in the future, the actual amounts in current year dollars would vary.

The results by carrier for each of the forecasted variables are presented in the remainder of this section on Tables 2-2 through 2-8. They clearly indicate that the changes are not uniform among

the six transit operating companies.

Table 2-2: Vehicle Hours (000's)

Carrier	Base	Increment	Forecast
Green Bus Lines	714	184	898
Jamaica Buses	244	96	340
Liberty Lines Express	226	0	226
New York Bus Service	299	0	299
Queens Surface Corporation	765	41	806
Triboro Coach Corporation	597	90	687
Total	2,845	411	3,256

Table 2-3: Vehicle Miles (000's)

Carrier	Base	Increment	Forecast
Green Bus Lines	6,559	1,062	7,621
Jamaica Buses	2,227	674	2,901
Liberty Lines Express	2,802	0	2,802
New York Bus Service	3,553	0	3,553
Queens Surface Corporation	8,379	330	8,709
Triboro Coach Corporation	4,841	846	5,687
Total	28,361	2,912	31,273

Table 2-4: Peak Vehicles

Carrier	Base	Increment	Forecast
Green Bus Lines	201	63	264
Jamaica Buses	85	37	122
Liberty Lines Express	75	0	75
New York Bus Service	125	0	125
Queens Surface Corporation	271	38	309
Triboro Coach Corporation	217	16	233
Total	974	154	1,128

Table 2-5: Ridership (000's)

Carrier	Base	Increment	Forecast
Green Bus Lines	41,589	4,076	45,665
Jamaica Buses	13,087	1,844	14,931
Liberty Lines Express	2,892	0	2,892
New York Bus Service	4,014	0	4,014
Queens Surface Corporation	27,675	1,456	29,131
Triboro Coach Corporation	25,668	2,655	28,333
Total	114,925	10,041	124,966

Table 2-6: Operating Costs ($000's)

Carrier	Base	Increment	Forecast
Green Bus Lines	62,736	12,919	75,655
Jamaica Buses	26,903	9,017	35,920
Liberty Lines Express	18,657	0	18,657
New York Bus Service	23,826	0	23,826
Queens Surface Corporation	79,980	3,493	83,473
Triboro Coach Corporation	53,372	7,965	61,337
Total	265,474	33,394	298,868

Table 2-7: Revenue ($000's)

Carrier	Base	Increment	Forecast
Green Bus Lines	26,582	2,992	29,574
Jamaica Buses	8,357	1,413	9,770
Liberty Lines Express	7,728	0	7,728
New York Bus Service	10,511	0	10,511
Queens Surface Corporation	31,305	1,596	32,901
Triboro Coach Corporation	22,723	2,231	24,954
Total	107,206	8,232	115,438

Table 2-8: Deficit ($000's)

Carrier	Base	Increment	Forecast
Green Bus Lines	36,154	9,927	46,081
Jamaica Buses	18,546	7,604	26,150
Liberty Lines Express	10,929	0	10,929
New York Bus Service	13,315	0	13,315
Queens Surface Corporation	48,675	1,897	50,572
Triboro Coach Corporation	30,649	5,734	36,383
Total	158,268	25,162	183,430

Chapter 3 Capital Plan

The capital plan is comprised of vehicle purchases only, which represents the largest capital need for the franchised system. Not included are purchases of support vehicles or facility needs such as bus washers or additional maintenance bays, as well as passenger amenities such as signs, shelters, and kiosks. The vehicle purchases assume a standard 40 foot bus model to replace current vehicles, expand the fleet, and to provide a proper spares ratio. The facilities section provides an overview of the current capacity of each company's storage facilities, and the ability of each facility to handle the projected fleet size.

One capital recommendation that was made in the route recommendations section that is not mentioned in this section is the express bus transfer stations in Queens and Manhattan. Because of the scope of these stations, they would need to be further developed. This study does not provide a scope for these transfer stations, rather establishes the concept of an express bus transfer stations in order to provide access to Lower Manhattan, the East Side of Midtown Manhattan, and the West Side of Midtown Manhattan for all express bus riders.

3.1 Bus Purchases

The concluding element of the forecasts prepared as part of the current analysis is the number and timing of bus purchases. New buses should be purchased for two primary reasons; (1) replacement of existing buses as they reach their useful economic life and (2) expansion of fleet to permit the recommended plan to be implemented. In both the base condition and the future with an increase in peak vehicles, there should be a sufficient number of spare buses.

Consistent with accepted transit industry practice, the proposed fleet acquisition program was based on the following:

- **Spares ratio** - Transit agencies must have a sufficient number of buses to meet peak vehicle requirements as well as an adequate allowance for spare vehicles. These additional or reserve buses allow the operator to perform preventive maintenance activities, make running repairs and permit response to breakdowns. Consistent with industry practice and FTA guidelines an appropriate spares ratio (i.e., ratio of reserve buses to peak vehicle requirements) should be about 20 percent.

- **Useful life** - Urban transit coaches are typically viewed as having a useful economic life of 12 years. Buses that are retired prior to this period represent assets that have not been fully utilized. When buses continue to be placed in service beyond 12 years, the conventional wisdom is that these are buses being used past their reasonable expected life. While buses could still continue in service, the cost of maintaining this equipment becomes substantial. Further, the old buses lack modern enhancements that are incorporated in newer buses. Moreover, the Federal Transit Administration (FTA) uses a 12-year life when it considers grant application for new bus purchases.

Another guideline in developing the fleet acquisition program for the six carriers was that the program would cover a five year period from 2005 through and including 2009. This recognizes the necessary lead time to obtain buses. Further, it is assumed that the service expansion would be implemented in a uniform manner during this horizon period. It would be unrealistic to assume both operating and capital funds would be available to implement the recommended plan in a single year. Instead, a five year implementation period is assumed, which may also be an

optimistic scenario. However, the importance of having a sufficiently sized fleet with modern equipment can not be overstated. As will be shown later, the current fleet is not adequate or acceptable in terms of the number of buses (i.e., peak requirements and allowance for spare coaches) and their age. Another point is that the fleet requirements presented in this analysis assume conventional buses, rather than articulated coaches.

Data compiled by the New York City Department of Transportation, in their report entitled *Active Fleet Roster of the Subsidized Private Bus Operators* which is dated June 2003, was used in the current analysis. It presents the number of buses by manufacturer, model, seating and age for each of the operators. These data were combined with the peak vehicle requirements established by New York City Department of Transportation for December, 2002 along with consideration of the 2001 National Transit Database submission to the Federal Transit Administration and the 17A forms to the New York State Department of Transportation. Further, a route level database was established in the route evaluation phase of the study and also considered in developing the base condition.

The first step in developing the fleet requirements was to determine the peak vehicle requirements by operator and the six carriers combined. Consistent with transit industry practice, the number of spare vehicles was established at 20 percent. This results in a fleet requirement of 1,168 buses to assure an adequate number of buses to reliably meet scheduled service needs as shown below on Table 3-1.

Table 3-1: Base (Current) Fleet Requirements

Carrier	Peak	Spares	Total
Green Bus Lines	201	40	241
Jamaica Buses	85	17	102
Liberty Lines Express	75	15	90
New York Bus Service	125	25	150
Queens Surface Corporation	271	54	325
Triboro Coach Corporation	217	43	260
Total	974	194	1,168

When this requirement is compared to the actual number of buses from the active fleet roster, it would appear that there is not a sufficient number of buses. The current spares ratio is only about 14 percent, which is well below the desirable value of 20 percent. For this reason, the recommended fleet purchase programs should address the inadequate number of spare buses in the base condition. The fleet should be increased by 53 buses in addition to consideration of the recommended plan, which calls for expanded service and increased fleet requirements. These results are presented below on Table 3-2 for each carrier and the combined system.

Table 3-2: Adequacy of Base (Current) Fleet

Carrier	Required	Actual	Need
Green Bus Lines	241	234	7
Jamaica Buses	102	103	(1)
Liberty Lines Express	90	86	4
New York Bus Service	150	143	7
Queens Surface Corporation	325	313	12
Triboro Coach Corporation	260	236	24
Total	1,168	1,115	53

In addition to the fleet not having an adequate number of buses, the age of the fleet is extremely high. The current fleet was also examined in terms of the year of manufacture and age in 2004. About half the combined fleet for the six operators exceeds their useful or economic life as shown on Table 3-3 below.

Table 3-3: Age of Current Fleet (2004)

Age	Buses	Percent
1-3	6	0.5
4-6	262	23.6
7-9	50	4.5
10-12	238	21.4
13-15	74	6.6
16-18	356	31.9
19-21	104	9.3
22-24	25	2.2
Total	1,115	100.0

Overall the current fleet has an average age of 12.4 years. Ideally, the fleet would be comprised of buses purchased during the past 12 years with about 8.3 percent of the fleet in any given year with an average age of six years. Because of the time required and availability of resources, this fleet distribution is not achieved; however the current fleet is well outside the acceptable norm for fleet age. The implications of this vintage fleet is the difficulty in having sufficient number of buses, cost of maintaining old equipment and lack of features routinely available on newer buses. From the customer standpoint, this implies less reliable service and fewer amenities to enhance the riding experience. Thus, any bus purchase program will consist in part of replacing buses that are beyond their useful life. In view of the characteristics of the current fleet, this

alone will be a necessary, but ambitious and costly endeavor.

In addition, the fleet acquisition program should reflect the service expansion program discussed previously. The fleet requirements associated with the recommended plan is presented in terms of peak, spares and total bus needs as shown on Table 3-4.

Table 3-4: Increment Fleet Requirements

Carrier	Peak	Spares	Total
Green Bus Lines	63	13	76
Jamaica Buses	37	7	44
Liberty Lines Express	0	0	0
New York Bus Service	0	0	0
Queens Surface Corporation	38	8	46
Triboro Coach Corporation	16	3	19
Total	154	31	185

Combined with current requirements, the dimensions of the bus fleet by 2009 was determined as shown on Table 3-5.

Table 3-5: Forecast Fleet Requirements

Carrier	Peak	Spares	Total
Green Bus Lines	264	53	317
Jamaica Buses	122	24	146
Liberty Lines Express	75	15	90
New York Bus Service	125	25	150
Queens Surface Corporation	309	62	371
Triboro Coach Corporation	233	46	279
Total	1,128	225	1,353

Utilizing both current and future bus requirements, a bus purchase program was prepared for each carrier and all six transit operators combined. They indicate when buses are retired from the fleet and when purchases are made between 2005 and 2009 as shown in Appendix I.

The bus acquisition program was developed to replace buses past their useful life, assure an adequate supply of spare vehicles for the fleet and to permit implementation of the recommended plan. One objective was to acquire a uniform number of buses in any given year to support both the fleet replacement and expansion. In this way, a more uniform age distribution and purchase

program could be carried out subsequent to 2009. Another feature of the fleet replacement program is that the spares ratio is brought into compliance with a 20 percent spares ratio in 2005. A total of 1,035 buses would be purchased during the five year planning program as shown below on Table 3-6.

Table 3-6: Bus Purchases By Year

Year	Buses
2005	207
2006	207
2007	207
2008	207
2009	207
Total	1,035

As noted previously, the bus purchase program has three primary purposes which include adding to the fleet to assure an adequate spares ratio for current service levels, replacement of buses as they exceed their useful life of 12 years and expansion to permit the recommended plan to be implemented as shown on Table 3-7 below:

Table 3-7: Bus Purchases By Purpose

Purpose	Buses	Percent
Adjust Spares	53	5.1
Replacement	797	77.0
Expansion	185	17.9
Total	1,035	100.0

About three of every four vehicles being purchased during the five year period (i.e., 2005 through 2009) would replace buses past their useful life. Of the 1,115 buses in the current roster, all but 318 are proposed for replacement. The major fleet acquisition program results in the average fleet age declining from about 12 years to only four years in 2009. At this time, no vehicles would exceed their economic life.

With implementation of the fleet purchase program, the average age of the fleet would decline to about four years, affording patrons a comfortable riding experience in modern transit vehicles. This change is shown in the accompanying on Table 3-8 and on Figures 3-1 and 3-2, which show the distribution of fleet age and year of manufacture in 2004 and 2009.

Figure 3-1: Fleet Age

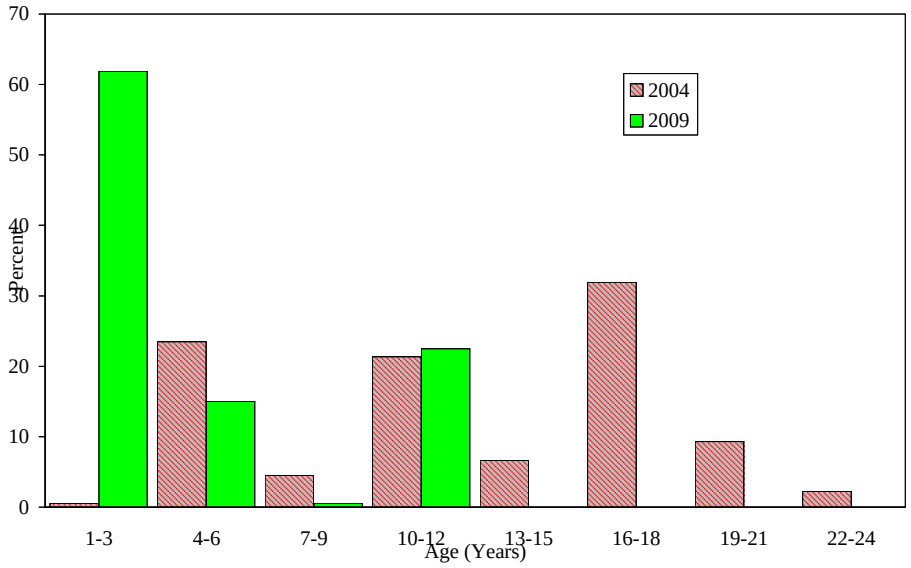

Figure 3-2: Distribution of Fleet Age

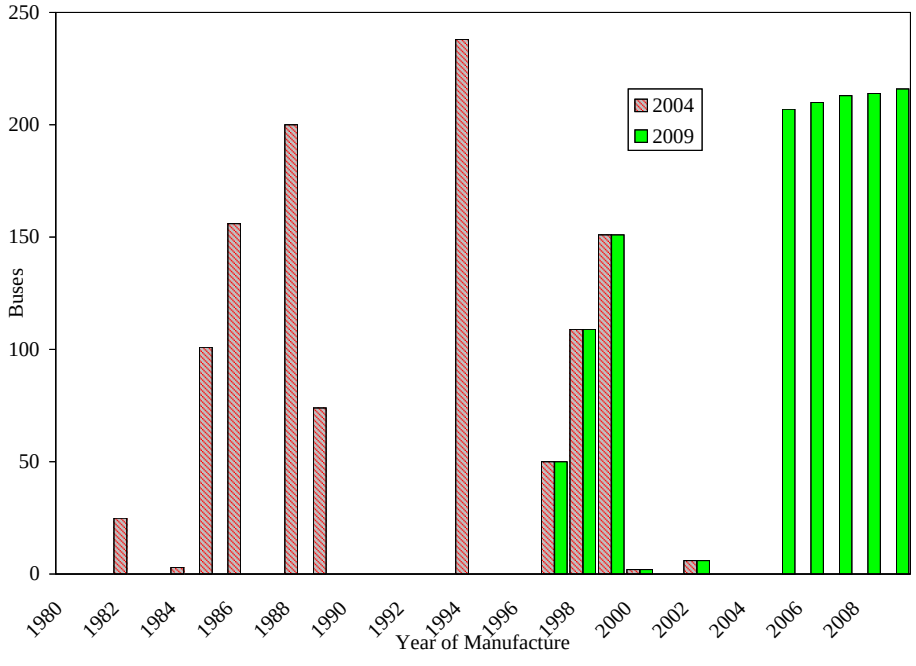

Table 3-8: Age of Forecast Fleet (2009)

Age	Buses	Percent
1-3	828	61.2
4-6	207	15.3
7-9	8	0.6
10-12	310	22.9
13-15	0	0.0
16-18	0	0.0
19-21	0	0.0
22-24	0	0.0
Total	1,353	100.0

Assuming a bus purchase price of about $350,000 for an urban transit bus and $420,000 for a suburban coach and the need to buy 1,035 buses would result in a capital expenditure of about $383 million. Three points are worth noting. First, the purchase price could vary based on such items as equipment, features and propulsion. Equipment type could vary from an urban bus with front and rear doors to suburban coaches with a single door and high back seating and intercity cruisers similar to those used by MTA-NYCT (e.g., Staten Island express bus service). Second, the plan assumes purchase of conventional buses that are 40 or 45 feet in length. It is recognized that certain bus routes could support articulated buses which could change the operating plan and capital program. Finally, the cost of bus purchase would be substantial without expansion of service. With no service changes, a total of 850 buses or 170 buses annually would still need to be purchased during the next five years. Annual purchases would permit adjusting the spares ratio (i.e., 53 buses) and replacement of buses past their useful life (i.e., 797 buses). This would result in a total expenditure of nearly $317 million.

3.2 Storage Facilities

A key issue with the purchasing of additional vehicles for the NYCDOT Franchised Bus carrier fleet is the ability of the individual companies to store the buses during off-peak hours. While some of the carriers may not have any difficulty storing additional vehicles, some facilities may not afford adequate storage. To determine the impact on current facilities, the study team reviewed an early analysis prepared for the MTA by Parsons entitled *Audit of Private Bus Carriers*. While not part of the current analysis, it is recognized that other facility and equipment changes and improvements will be required.

- **Green Bus Lines –** This carrier operates from two facilities one located in Jamaica around Rockaway Blvd and the other located in Arverne on Rockaway Beach Boulevard. At the time of the audit by Parsons, the Jamaica facility housed 179 vehicles, while the Averne facility housed 56 buses for a total fleet of 235 buses. According to this audit the Jamaica facility is barely able to house a fleet of 179 vehicles. The Averne facility is able to house the fleet of 56 vehicles with some room to grow. This study calls for increasing the Green Bus fleet to 317 vehicles. To house this fleet, more of the vehicles will have to

operate out of the Averne facility, and additional bus storage space at the Jamaica facility will need to be developed.

- **Jamaica Buses –** This firm operates only out of one depot located near the intersection of Guy R. Brewer Boulevard and Linden Boulevard. This facility houses the entire fleet of 103 vehicles. The Parson's audit mentions that this site is barely able to house the fleet of 103 vehicles. This plan proposes raising the Jamaica Bus fleet up to 146, which is more than what the Parson's audit says this depot could accommodate. However, the NYCDOT Fleet Audit mentions that in 1983 Jamaica Buses did operate 152 buses, which is more than the proposed 146 from this plan.

- **Liberty Lines Express –** This company operates 86 vehicles out of a facility in Yonkers. This facility is able to store all 86 vehicles onsite, according to the Parson's audit. Under this plan, the Liberty Lines Express fleet will grow from 86 vehicles to 90 vehicles in order to have a proper spares ratio. The current facility should be sufficient to house this fleet.

- **New York Bus Service –** This carrier operates from a single facility located in Co-op City in the Bronx. According to the Parson's audit, all vehicles are able to be accommodated at this site, with plenty of room for expansion. This study does not provide additional service for New York Bus Service. However the fleet will grow to 150 vehicles, from 143, to provide a proper number of spare vehicles.

- **Queens Surface –** This firm operates out of a single facility located in College Point, Queens. This facility, according to the Parson's audit, is barely able to store the entire fleet of 313 vehicles. Under this plan, the Queens Surface fleet will increase to 371 vehicles. With a reorganization of the vehicle storage areas, this facility should be able to accommodate this enlarged fleet.

- **Triboro Coach -** Their facility is located in Jackson Heights, Queens right across from LaGuardia Airport. This facility is currently overburdened, with about 40 vehicles, of its 236 vehicle fleet, currently parked on the street according to the Parsons' audit. This fleet is projected to grow to 279 vehicles which will be much larger than the current fleet Triboro is already unable to store. Additional storage capacity needs to be developed for the Triboro fleet in order to house the expanded fleet, as well as meet the storage space needs for the current fleet.

Chapter 4 Service Implementation

Implementing this service plan is based on two factors: (1) the necessary operating funds and (2) the availability of capital resources for vehicles. Fares paid by riders will need to be supplemented by tax support from city, state, and federal government sources. Additional operating funds from new or existing sources would be needed to initiate service expansion. Capital resources e.g. vehicles, are a rather large hurdle for the addition of service since the fleet of the NYCDOT franchised carriers is quite old, and forced retirement of vehicles, without replacements, is actually resulting in less service being provided. The capital plan presented previously is designed to replace all aging vehicles, provide a proper number of spare vehicles to maintain service, and provide vehicles to expand service within a five year time frame. Service expansion comes in the form of meeting the capacity needs on existing routes and providing additional new services. The capital plan and this implementation are based only on the service recommendations from this study. This implementation plan does not provide staging for route recommendations; rather it sets priorities for implementing the recommended route changes.

4.1 Service Implementation Priorities

In order to properly implement this plan for NYCDOT franchised carriers, a set of priorities for the new services modifying existing and new service need to be established. It is recognized that regardless of any staging decision (including no changes) would require replacing the aging fleet and providing adequate spare vehicles. The following list provides a set of factors considered for setting priorities for implementing this plan:

1. Maintain current service levels and service coverage area

2. Reduce overcrowding by expanding service on existing routes

3. Implement new routes that will provide for improved transit service in New York City

Vehicles purchased under the capital plan are designed to meet each of these goals. The schedule of vehicles provided in the capital plan allows NYCDOT to meet all or portions of each of the goals each year. The specific route recommendations are for the most part independent of other route recommendations and can be implemented as vehicles are available based on the priorities. In a few instances some route changes need to be done in conjunction with other route changes or require the cooperation of the Metropolitan Transportation Authority – New York City Transit (MTA-NYCT). All route number nomenclature changes proposed can be implemented immediately, as these changes have no effect on operating costs or vehicle requirements.

Table 4-1 presents the type of route changes proposals presented in the route recommendations section, along with which routes have each of these types of proposals. Utilizing the above priorities and ease of implementation, each route proposal type is assigned a priority level. It is understood that for the implementation of any proposal, proper resources are needed.

Table 4-1: Local Route Change Types

Change Type	Priority	Green Bus Lines	Jamaica Buses	Queens Surface	Triboro Coach
Nomenclature Change	High	Q9A, Q10A	Q110 (branch)	Q65A, Q101R	Q19A, Q19B, Q38, Q53
Increase Service to Meet Demand	High	Q6, Q9, Q10, Q11, Q40	Q113	Q25, Q66	
Re-Route/Route Rationalization	Medium	Q9, Q10, Q37, Q40	Q110, Q111, Q112, Q113	Q66	Q23
New Branch/Route Extension	Medium	Q6, Q7, Q8, Q9, Q10, Q11	Q111	Q65, Q65A, Q102, Q103	Q18, Q19, Q23, Q33, Q38, Q39, Q72
New/Change Short Turn Location	Medium				Q19B, Q23
Limited Stop Service	Medium	Q10	Q113	Q25, Q65	
Additional Stops on Limited Stop Routes	Medium			Q101R	Q53
Complete Route Restructuring	Low	Q9A			
Route Consolidation	Low	Q22, Q35	Q112	Q66	Q45, Q47
Split Route	Low			Q25, Q65, QBx1	
Route Length Reduction	Low	Q41, Q60			
Service Reduction	High			Q67	Q38
Route Elimination	High	Q21		Q34	
No Change	None	Q22A		Q101, Q104	Q29

4.2 Specific Route Change Dependency Issues

The service areas listed below have numerous route changes would need to be implemented at the same time in order to prevent a loss of service coverage to the Queens bus route networks. Not all of the recommended changes on the routes identified would need to be made at one time, rather just the recommendations in the specific locations. The proposals that have multiple dependant changes are listed below:

- **South Cargo Road Cargo Area at JFK Airport** - The change of the eastern terminal of the Q7 from the JFK Airport cargo areas to Green Acres Mall will require the Q6 branch to serve ensure no loss of service to this cargo area.

- **South Ozone Park Service Rationalization** – Changes to the Q9, Q10, and Q37 in the area of South Ozone Park located south of Rockaway Boulevard would need to be implemented at the same time to maintain service coverage in this neighborhood.

- **Rockaway Park** – An extension of the Q53 in Rockaway Park will have to occur at the same time as service is eliminated on the Q21 to ensure this area remains served.

- **Hamilton Beach/Howard Beach/Lindenwood** – Changes to the Q11 in this area will need to occur at the same time as cutbacks to the Q41 to ensure that service in this area is not lost.

- **Middle Village** – The extension of the Q18 to Metropolitan Mall will be required during off peak periods in order to cutback the Q67 to peak only service.

Some other routes will require cooperation and coordination with MTA-NYCT before changes could occur. Most of the route recommendations that involve MTA-NYCT coordination are longer term recommendations, however some of these issues may need to be solved in a shorter term time period. The route areas that require MTA-NYCT cooperation or coordination are listed below:

- **Jamaica Avenue** – To establish a full length Jamaica Avenue route, coordination is needed with the MTA to change eastern terminal between routes Q110 and Q36. Also, consolidation of the Q110 and Q56 into one service would require cooperation with the MTA-NYCT.

- **Liberty Avenue** – To establish a full length Liberty Avenue route, routes Q112 and B12 would need to be consolidated into one route requiring cooperation with the MTA-NYCT.

- **Northern Boulevard** - To establish a full length Northern Boulevard route, routes Q66 and Q12 would need to be consolidated into one route requiring cooperation with the MTA-NYCT.

- **North Flushing** – In eliminating the Q34, a minor re-route of the Q14 would need to occur in order to cover areas left unserved by the Q34. This is a relatively minor re-route; however it will require MTA-NYCT cooperation.

Chapter 5 Summary

The analysis presented in this memorandum provides a description of the data sources, assumptions and procedures used in the development of forecasts with implementation of the recommended plan. It indicates a plan that calls for about a one-sixth increase in service to both remedy current deficiencies and exploit future opportunities. A fleet acquisition program is also presented which is mandated to replace vehicles past their useful life, assure an adequate number of spare buses and permit expanded service as called for in the recommended plan. Finally, priorities are assigned to the numerous changes that have been proposed to the existing bus routes and new services.

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