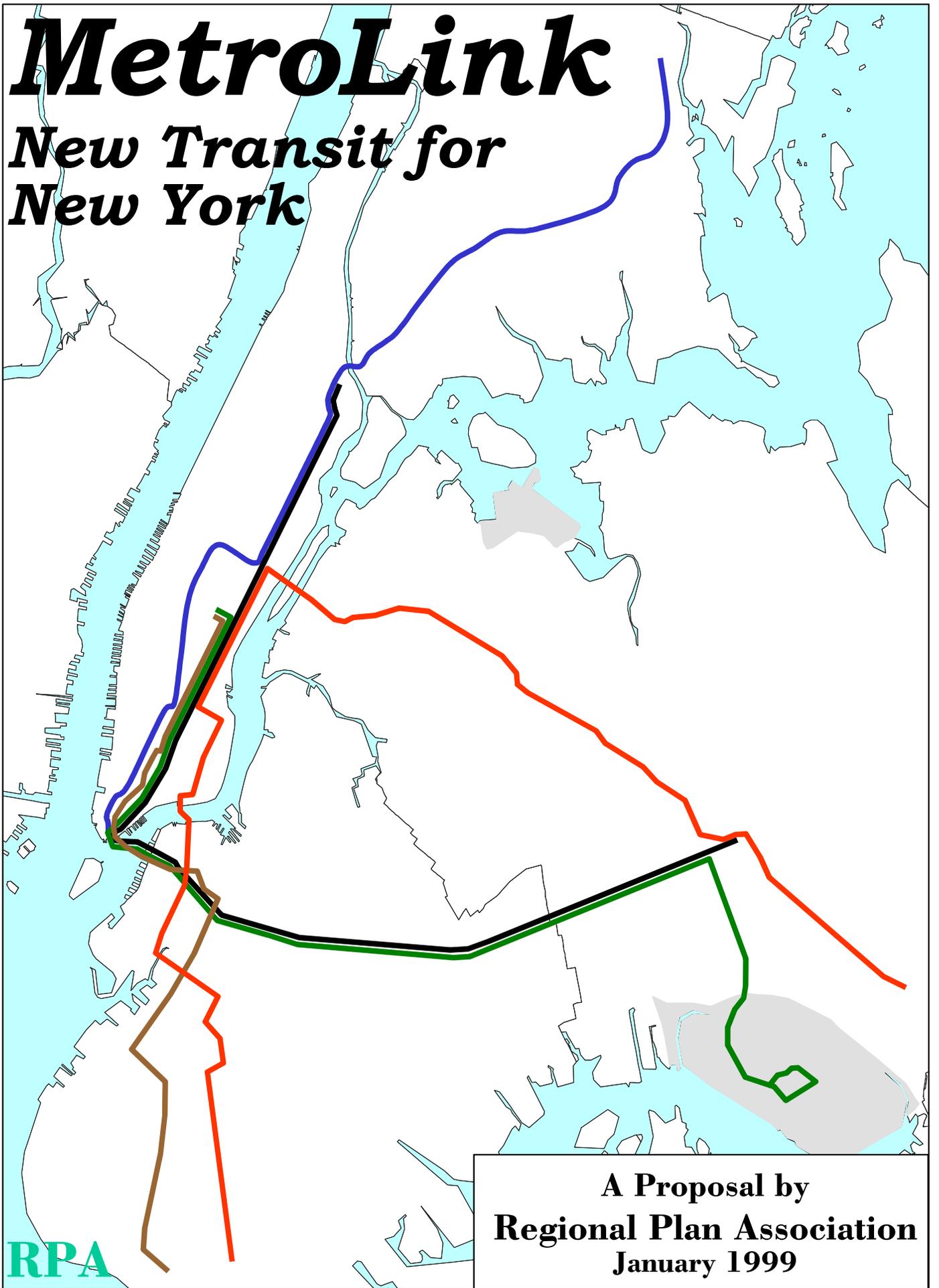


MetroLink

***New Transit for
New York***



RPA

**A Proposal by
Regional Plan Association
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Acknowledgments

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EXECUTIVE SUMMARY

In 1996, RPA, as part of its Third Regional Plan, A Region at Risk, proposed a comprehensive program of Regional Express Rail (Rx) to interconnect and expand the New York Metropolitan region's rail network. **MetroLink** is an outgrowth and elaboration of Rx.

In the three years since the RPA Rx plan was announced, several key Rx recommendations have been accepted. The Metropolitan Transit Authority (MTA) has decided to construct the Long Island Rail Road (LIRR) connection to Grand Central Terminal. The Port Authority has begun construction of the *Airtrain* link from Kennedy Airport to Jamaica Center and to Howard Beach.

But where action is most imperatively needed is in the transit system at the Region's core, the New York City subway system. The subway system has become the victim of its own success. Subway ridership has shot up, the result of a \$20 billion investment to upgrade the subways and return them to a state of good repair, of innovative fare policies made possible by the flexibility of MetroCard that have tapped pent up demand, and of the economic rebound of the 1990's. But subway capacity has not increased along with ridership growth. The lines that have been historically overcrowded-- the Lexington (Lex) and Queens Boulevard lines-- have gotten much more so. With today's elbow-to-rib levels of crowding, trains are forced to wait in stations while passengers fight to get on and off, delaying departures, causing backups of following trains, and undermining service reliability.

The root of the problem is that there have been no meaningful additions to subway capacity since 1940. With the tearing down of the Second and Third Avenue elevated lines in Manhattan in the forties and fifties, rapid transit capacity is now significantly below the levels of 1940. The Lex has the burden of carrying all of the north-south subway traffic generated by the residential growth on the Upper East Side over the last 50 years. Meanwhile, promises of a Second Avenue Subway repeatedly have gone unkept since the 1920's.

What makes the subway capacity problem even worse is that the current subway system does not take many New Yorkers where they want to go. The subway system was built during the first 40 years of this century to connect the residents with the jobs of a pre-World War II New York. Subways and commuter rail were left with poor connections, a product of the divided legacy of three rapid transit systems and multiple commuter railroads. Today, almost three generations later, that system is badly out of alignment with the new neighborhoods and new job centers of a 21st Century city that must compete in a new global economy. These isolated communities include eastern Queens, Co-op City, and the neighborhoods east of Second Avenue over the full length of Manhattan. The result is that hundreds of thousands of commuters must take circuitous routes with multiple transfers to get to work, further straining the subways' already overburdened capacity.

The commuter rail systems from the north (Metro North), the east (LIRR), and the west (NJ TRANSIT) all fail to deliver riders directly to Lower Manhattan, requiring all Commuters to the Financial District to transfer to a crowded subway to complete their

journey.

The east sides of Manhattan from East Harlem to the Lower East Side, with a dozen neighborhoods in between, are beyond a reasonable walk to a subway station. This is true, as well, for many neighborhoods in the far reaches of The Bronx and Queens, who also suffer from having an especially slow ride to reach the job centers in lower and midtown Manhattan.

Finally, travelers to Kennedy Airport, even after *Airtrain* is completed, will still not have a one-seat-ride to the airport.

MetroLink is a four-borough system-wide solution to the worst capacity and connection problems of the subway system. Each component of **MetroLink** is tied to the others in ways that solve multiple transit problems and offer multiple service benefits. **MetroLink** does this by combining strategically targeted new construction with better uses of under-utilized subway and rail transit facilities in a framework of citywide transportation needs.

MetroLink provides five separate services that would add the capacity for a quarter-million new riders each peak commuting period. It would end the intolerable conditions on the subway's most crowded lines, make better connections to transit dependent areas like Lower Manhattan, and ensure that future economic growth does not become constrained by inadequate transportation. In addition, by eliminating the need for several awkward transfers, **MetroLink** would provide substantial savings of travel time for tens of thousands of current riders as well. Many longer trips will be shortened by a half-hour. At least three dozen identifiable home-to-work markets would have direct new one-seat rides or rides with easy across-the-platform transfers.

MetroLink would end the currently intolerable overcrowding on the subway system's most congested lines, including the Lexington Avenue express and local lines (4, 5, 6) on Manhattan's East Side, the Queens Boulevard express (E, F) lines in Queens, and the West Side Seventh Avenue (1, 2, 3, 9) line in Manhattan.

MetroLink would add three new subway services to lower Manhattan serving 9 stations in the financial district. The financial district would be fed from six residential markets with which it is now poorly connected: the Upper East Side, The Bronx, Westchester and Connecticut via Grand Central Terminal, Long Island via Jamaica, Kennedy Airport, and South Brooklyn.

MetroLink would give suburban commuters to Lower Manhattan direct rail service from Grand Central Terminal for Metro North riders and from Jamaica for Long Island Rail Road riders, permitting them to avoid the overcrowded Lexington Avenue line and other crowded subway services.

MetroLink would put the subway within reach of hundreds of thousands of New Yorkers who now are beyond a reasonable walk of the system. Manhattan residents of many communities on the east side including East Harlem, the Upper East Side, Turtle Bay, Kips Bay, Murray Hill, Peter Cooper Village/ Stuyvesant Town, East Village, the lower East Side, would all be within easier reach of the subway system. So too would

Queens residents in South Jamaica, Locust Manor, and Laurelton, and in the south-central and more northerly portions of the Bronx in Parkchester and Co-op City.

MetroLink would offer connectivity missing from the system today, which leads to extra time-consuming, inconvenient and uncomfortable transferring. Brooklyn and Queens residents would be able to reach east midtown effortlessly, which they are unable to do today. Upper East Siders would be able to reach west midtown without transferring.

MetroLink would speed riders to Manhattan who now must travel for an hour or more to reach the heart of the City. Northern Bronx and southeastern Queens would especially benefit with timesavings of one-half or more.

MetroLink would also offer a one-seat ride to Kennedy Airport from Manhattan and Downtown Brooklyn.

MetroLink will require a major capital investment, including approximately 19 miles of new subway tunnel, 31 new stations plus four converted from commuter rail, storage yards, and 950 new Rx hybrid rapid transit cars. These hybrid vehicles, following on the Rx concept, would have the dimensions to operate on both subway tracks and commuter rail lines, allowing service to be shifted from one to another to take advantage of underused rail rights-of-way in the Region. The vehicle would be designed to carry large numbers of people at high speeds and at high levels of comfort, combining the best features of rapid transit and commuter rail service.

By making use of elements of the existing subway and commuter rail network that are either unused or not used to their fullest potential, ***MetroLink*** will add to the value of the newly built portions of the transit network. It will be built with 21st Century state-of-the-art communication and signal systems to further expand the capacity, improve the safety, and ensure the reliability of the transit system.

The keystone of ***MetroLink*** is a new north-south subway line to be built the length of Manhattan on the east side, largely under Second Avenue, and continuing downtown along Pearl and Water Streets, and then through a new tunnel under the East River to Brooklyn. This trunk line would connect with existing lines or be extended with branches in seven locations:

- 1) extending north into the Bronx to Co-op City;
- 2) connecting west at 63rd Street to west Midtown;
- 3) connecting east to Queens via the 63rd Street East River tunnel;
- 4) with a spur to Grand Central Terminal;
- 5) through the Lower East Side and East Village with a new tunnel;
- 6) linking with the existing Nassau Street subway in Lower Manhattan; and
- 7) extending toward Jamaica and Kennedy Airport using the LIRR Flatbush Ave. (Atlantic) Branch.

Twenty-first century New York needs a seamless regional transit system that provides major new passenger capacity and new direct connections between today's growing neighborhoods and job centers. ***MetroLink*** is the next indispensable step towards creating that system. It adds the subway service needed to: relieve overcrowding on the Lex and the Queens Boulevard lines; begin to provide better access to Lower Manhattan from city neighborhoods and suburban communities; and provide subway service to currently unserved areas on Manhattan's East Side, in Brooklyn, The Bronx, and in Queens-- all in a new generation of more comfortable, technologically advanced vehicles designed to utilize state-of-the-art communications and signal technologies.

INTRODUCTION

Few dispute that adequate transportation infrastructure is essential to maintaining long term economic growth. In this Region, where population density provides a fundamental economic advantage, this first of all means mass transit. Three years ago, in its **Third Regional Plan: A Region at Risk**, Regional Plan Association (RPA) advanced a bold proposal to address regional mass transit's growing problems of capacity, reliability, and lack of direct connection for modern travelers. It proposed integrating the 1,250 miles of commuter rail and rapid transit into one seamless regional mass transit system; making maximum use of all its components to dramatically increase both transportation availability and comfort. This plan, called Rx, has three principal components:

1. Greatly increasing rail transit capacity and convenience by adding just 25 miles of strategic new lines and connections among various subway and commuter rail lines;
2. Facilitating mass transit use by getting all rail transit systems to adopt a common fare structure that would make the Region's rail systems function as a unified system from the traveler's perspective.
3. Exploring innovative technologies such as hybrid "Rx" vehicles to better link commuter rail and subway transit modes.¹

Since the RPA plan was made public important, progress has been made in realizing that plan. Governor Pataki endorsed a key feature of the RPA plan, the Long Island Rail Road (LIRR) connection to Grand Central Terminal (GCT). As a result over \$350 million was authorized for the project by the Federal government as part of the recent national transportation legislation, known as TEA-21. The Metropolitan Transportation Authority (MTA) has projected 2012 as the date of completion. The Port Authority of New York and New Jersey is also moving forward with the rail connection from Kennedy Airport to a newly designed LIRR station in Jamaica Center. Funded by the \$3 passenger facility charge, this project to be completed in 2003, at RPA's insistence, is being designed to be compatible with rapid transit or commuter rail to make a one-seat ride to Manhattan from Kennedy Airport possible at a later date.

A central premise of this report is that a new Rx rapid rail transit system, known as **MetroLink**; an extension of and elaboration on RPA's Rx plan, is a necessary step to be advanced in the same time frame as the two projects described above.

MetroLink represents the next step towards fulfilling the Rx vision for the region: modern, efficient, and seamless mass transit. It would create a modern, comfortable, and technologically advanced system where it is most needed—along Manhattan's Second Avenue corridor and through the resurgent and poorly served neighborhoods of Queens, Brooklyn, and The Bronx. The system would be integrated with existing but under-utilized subway and commuter rail facilities. This proposal updates and refines and the Rx proposals in RPA's Third Regional Plan, based upon continued analyses, public input, and changing needs.

1. An Rx vehicle is a hybrid that has more comfort and advanced technology than a typical subway car, but is not quite a commuter rail car. It can run on converted commuter rail lines and on subway tracks. The vehicle would be built to the modern IND/BMT standard. Use of the hybrid Rx car was proposed for new transit investments to make possible integrated commuter rail and subway operations. Since use of the hybrid vehicle would require platform modifications at commuter rail stations, continuous use would not be an option on all commuter rail lines. However, it presents significant opportunities in instances where commuter rail lines are currently abandoned or so significantly under-utilized that a combined Rx system would provide better service.

THE NEED FOR NEW RAIL TRANSIT CAPACITY

In 1998 subway ridership reached its highest point in 28 years, and the growth has shown no signs of abating. This is cause for celebration on many fronts: economic, environmental, and financial. But for the same reasons it is also a cause for grave concern; as current and expected growth in subway ridership overwhelms existing subway capacity, making already intolerable conditions on key lines, slowly but inexorably worse. Subway conditions are one of the largest negatives in New York City's quality of life when mass transit should be one of the City and Region's greatest selling points. New York City is forecast to add 650,000 jobs over the next two decades, but can it realistically be expected to realize that potential when it lacks the rail transit capacity to serve so many new riders?

The forces that have created this capacity problem are a series of enlightened policies and beneficial trends whose widespread public support strongly suggests that they will remain and expand in the future. They include:

- The MTA's "State of Good Repair" program, which has invested over \$20 billion since the early 1980's in overhauling the tracks and subway cars of the current system, renovating its stations, and keeping them free of graffiti, making subway performance and conditions more attractive to riders. By the end of 1998, subway ridership had grown by 20 percent since 1985 and was at its highest point since 1970.
- A recovering New York City economy. Though still somewhat lagging behind national trends, city employment has steadily grown since the recession of 1989-1992. More jobs also mean more subway and commuter rail riders, especially during peak commuting periods, when capacity is most lacking.
- MetroCard, with its fare innovations-- free bus-subway transfers, discount cards, and weekly and 30-day transit passes-- has spurred a daily increase of 400,000 subway riders in the last year alone. The daily \$4 pass aimed at tourists should continue to promote ridership growth.
- TEA 21 includes provisions that make TransitChek, tax-free vouchers from employer to cover employee mass transit use, much more attractive.² TransitChek use should markedly increase (especially since its value will fully cover the cost of the MetroCard unlimited monthly travel pass), spurring new ridership.
- The proposed connection of the LIRR to Grand Central Terminal is an excellent project that will save at least one-half hour a day for 50,000 commuters from Long Island and Queens. But it will also add 19,000 daily riders to the Lexington Avenue #4, #5, and #6 subways. The "Lex" is already the most crowded line in the subway system. The added riders will worsen these already intolerable conditions for the hundreds of thousands of subway riders and Metro North commuters who must crowd onto the Lex each day.
- The continued revitalization of Lower Manhattan will require more reliable and fast transit connections to the rest of the city and its suburbs.

² Employers may now offer TransitChek in lieu of compensation, whereas before they could only offer it as a raise. TransitChek is a tax-free benefit, meaning that it is compensation (up to \$65/month that is not subject to state, federal, or local taxes (including FICA/Social Security). This lowers the cost of the 30-day pass for the typical commuter to about \$45. Plus employers avoid the 7.51 percent FICA match that they would otherwise be responsible for. This saves employers about \$60 annually for the typical employee.

- With vehicle traffic in Manhattan already at gridlock, increased auto use is not an option for accommodating economic growth. More and more Manhattan workers will need to have an attractive transit choice if we are to grow.

Today's subway system does not have the capacity to serve this current and anticipated growth in ridership. Conditions on some key lines like the Lex are already moving from intolerable to impossible. When subway crowding reaches a certain point, the boarding problems and resulting delays make maintaining reliable service impossible.

What heightens the capacity crisis is that the current subway system, which was planned and built between 1900 and the 1930's, no longer matches modern commuting patterns. Since the subways were built, Midtown has become a major office center, Queens has fully developed, the immigrant surge of the 1990's has shifted neighborhood dynamics, and the Upper East Side of Manhattan has seen the construction of hundreds of high-rise residential towers. The resulting mismatch between available subway service and today's travel patterns means that there is insufficient capacity in many places where it is needed most.

Since the 1930's New York has made only minimal additions to its subway system, while the demolition of elevated lines like the Second and Third Avenue Els has reduced capacity by over 10 percent. Now, with the city economy resurgent and the subways finally benefiting from the rider-friendly policies so long proposed by mass transit advocates, the problem of insufficient subway capacity can no longer be ignored.

A Short History of the Second Avenue Subway

1929 Second Avenue Subway endorsed by RPA as part of Regional Plan of New York and Its Environs

1940 Second Avenue elevated line torn down

After 1945 - Substantial growth in midtown offices on East Side and residential construction on the entire Second Avenue corridor.

1955 Third Avenue elevated line torn down, changing avenue from dismal bar-lined street to rows of new office buildings.

1968 Grand Design of MTA included a full length Second Avenue Subway and the cross with 63rd Street tunnel to high-speed bypass in Queens

1972 Construction begun on Second Avenue Subway

1975 Construction halted on Second Avenue Subway, in midst of New York City financial crisis with capital funds used to save the 50-cent fare; three short sections of line were built and abandoned; the 63rd Street tunnel was completed, as were transit connections to it in Manhattan. The Second Avenue Subway became a symbol of New

York's inability to build major public works.

1982-1994 \$20 billion investment in subway system used almost solely for repairs, a necessary response to breakdowns after years of decline and neglect. System performance improves dramatically and ridership grows.

1994 MTA begins Manhattan East Side Alternatives (MESA) study to consider options in the Second Avenue corridor.

1996 RPA announces Regional Express Rail (Rx) as part of Third Plan; calls for use of a new hybrid vehicle on a Second Avenue line connected to Brooklyn, Queens, and the Bronx.

1996 Governor Pataki announces support for LIRR/GCT connection, part of RPA plan. Connection is projected to add almost 20,000 riders a day, 2,000 in peak hour, to Lexington Avenue subway line.

1998 Ridership on subways highest since 1970, a result of strong economy and fare innovations.

1999 RPA presents **MetroLink** proposal.

WHAT ARE THE PROBLEMS?

While the entire New York City subway system has seen a surge in ridership, two lines have been hit particularly hard by the crush of new riders: the Lex and the Queens Boulevard (E, F) lines to Manhattan. These two lines are already jammed elbow to rib during rush hour. A comfortable ride during peak periods is out of the question on these lines. Boarding riders are often forced to wait for two or more trains. Worse still is the effect of crowding at stations on train operations. Huge volumes of passengers getting on and off trains force the trains to spend more time in stations, backing up succeeding trains, and undercutting any hope of maintaining steady, reliable service.

The Upper East Side and the Lower East Side of Manhattan are among the most densely populated parts of the city, with 200,000 or more people per square mile in many places (see Figure 1: Manhattan Population Density). This area lost rapid transit with the razing of the Second and Third Avenue Elevated lines in the 1940s and 1950s. Their demolition came with the promise of new subway capacity under Second Avenue, a project finally started in the 1970's, only to be almost immediately stopped by the 1975 fiscal crisis (see box for a brief history of the Second Avenue subway). Much of the East Side was zoned for high-rise development in anticipation of the new Second Avenue line. The buildings were built, but the new subways were not. The East Side still has only the Lex, bulging with riders, while the Upper West Side, with similar densities, benefits from two lines and twice the train capacity.

Adding further to the crush on the Lex are the riders joining the line from Queens and from the suburbs. Each connection in Midtown adds riders: at 59th Street the N and R; at 51st Street the E and F; and at 42nd Street the #7 as well as Metro North riders transferring at Grand Central Terminal.

The distances that need to be walked to reach Lexington Avenue further diminish its service quality, both on the Upper East Side and south of 14th Street in the East Village and on the Lower East Side. Walks of 1/2 mile or more to reach a subway stop are commonplace for Manhattan East Side residents, requiring them to reach the subway by bus.

Lower Manhattan is the third largest business district in the US, and suburban commuters make up a crucial component of its workforce. Yet none of the three commuter rail networks feeding the Manhattan Central Business District (CBD) – the LIRR, Metro North or NJ TRANSIT – provide direct access without a transfer to a crowded and often unreliable subway line. Metro North commuters who work in Lower Manhattan and must transfer to the Lex at Grand Central face a long walk to crowded platforms and then a slow and unreliable ride on the subway system's most crowded trains. The lack of a reliable and comfortable transit connection to Lower Manhattan for suburban commuters has long been recognized as one of the greatest single barriers to Lower Manhattan's continued health and potential for growth.

The LIRR/GCT connection, which will help Long Island commuters, will only heighten the difficulties of commuters using Metro North. For Lower Manhattan workers who commute home on Metro North, the Lex's unreliability makes scheduling the evening trip home a game of chance. They must budget extra time and leave their offices early --sometimes 30 minutes or more -- to be assured of catching their preferred Metro North train home. Similarly, LIRR commuters working in Lower Manhattan must transfer to a crowded subway at either Penn Station or Atlantic Terminal in Brooklyn, sometimes after having made a previous transfer at Jamaica.

The Queens Boulevard subway is one of the most crowded in the system; it operates through thickly populated neighborhoods where there are no other reasonable travel alternatives. Queens

continues to add population at a faster rate than Brooklyn, Manhattan, or The Bronx. The current 63rd Street Tunnel project, nearing completion, will reduce the Queens Boulevard problem by adding 15 more Manhattan-bound trains per hour during the peak commuting period. However, Queens will still lack direct service to much of East Midtown, and the many thousands of commuters to the East Side will still have to make their current time-consuming and congestion-causing transfers to the Lex at 59th or 51st streets.

Southeastern Queens subway riders to Manhattan further suffer because they must first take a bus to reach the subway. In 1990, over 30,000 people transferred every weekday from the bus to the subway at stations at the eastern end of the Queens Boulevard Lines.³ With the MetroCard free transfer, that number has increased dramatically. Lacking a modern, direct, one-seat connection, these riders face travel times of well over an hour in each direction each day.

Huge stretches of Brooklyn, including Bay Ridge, Bensonhurst, Brighton Beach, Carroll Gardens and Brooklyn Heights, also have no direct connections to job centers on Manhattan's East Side, since the #4 and #5 (the Lex) do not serve those neighborhoods and transfer opportunities are limited. There are only two transfers to the #4 and #5 in Brooklyn (Pacific St/Atlantic Ave and Court St/Borough Hall) and three in Manhattan (Fulton/Broadway/Nassau, Canal St (to the #6), and Union Square) that connect the Brooklyn lines to the Lex and thereby to East Side workplaces.⁴ These transfers are difficult and time consuming, involving multiple sets of steep stairs and long, crowded walks through narrow pedestrian tunnels.

In The Bronx, residents of redeveloping neighborhoods like Melrose Commons and established high-density areas like Parkchester and Co-op City must take buses to reach the Pelham (#6) and overcrowded Dyre Avenue (#5) lines.

Even with the completion of *Airtrain*, the major business districts of Manhattan and downtown Brooklyn will still be without direct "one-seat" access to Kennedy Airport. Lower Manhattan in particular, will remain isolated, with travelers forced to either combine a slow trip on the A train to Howard Beach with the *Airtrain*, or take the subway to and LIRR terminal and then take the *Airtrain*. With such poor options, air passengers will not be enticed to use rail, and will drive or get driven on unreliable, clogged roadways.

WHAT IS *MetroLink*?

MetroLink is a new rapid transit system that will provide a major increase in subway service capacity, reduce overcrowding, and offer faster, reliable, and more comfortable direct service to critical transit markets such as Lower Manhattan and East Midtown. It incorporates five new transit services, using hybrid Rx vehicles, which provide the necessary additional capacity in the overcrowded corridors, the amenity today's riders are entitled to, and the potential for future integrated subway-commuter rail linkages.⁵ ***MetroLink*** would be built with 21st Century state-of-the-art communication and signal systems: to further expand the capacity, improve the safety, and ensure the reliability of the transit system.

³ New York City Transit 1990 Origin-Destination Survey.

⁴ The East River Crossings Study has recommended construction of a full transfer at Bleecker St/Lafayette St, which will provide another connection to the #6.

⁵ This document refers to the physical tracks used by the subway as "lines", and to a set of subway trains that operate between specific termini as "services." For instance, today's N service runs through the 60th Street tunnel and on the Broadway line through Manhattan.

The keystone of **MetroLink** is a new north-south subway line to be built the length of Manhattan on the east side, largely under Second Avenue, and continuing to downtown Brooklyn at Atlantic Terminal. At the north end the trunk line would start at 125th Street and Lexington Avenue, shifting over to Second Avenue just north of 116th Street, where it would continue in a southerly direction to Water Street and then in a new tunnel under the East River. This trunk line would connect with existing lines or extend onto new branches in seven locations:

1. An extension from 125th Street under the Harlem River and into the Bronx to Co-op City via new tunnels and on existing unused Amtrak right-of-way;
2. A tunnel connection from Second Avenue, heading west to the existing cross-town tunnel under 63rd Street to Broadway;
3. A tunnel connection from Second Avenue heading east to the existing cross-town tunnel under 63rd Street and under the East River to Queens;
4. A tunnel connection at 43rd Street to a new spur line under Grand Central Terminal;
5. A tunnel connection at 14th Street to a new tunnel heading east under 14th Street and then through the East Village and Lower East Side under Avenue C and Pitt Street, where it would connect to the existing Rutgers Street tunnel carrying the F train under the East River;
6. A tunnel connection at Delancey Street to the existing Nassau Street subway heading through the Financial District and out to Brooklyn; and
7. In Brooklyn a connection at Atlantic Terminal to the existing LIRR Atlantic Branch, which would be converted to transit service and allow trains to run out to Jamaica and Kennedy Airport.

The **MetroLink** system map is shown in Figure 2 and its new features are further depicted in Figure 3.

WHAT SERVICE WOULD *MetroLink* OFFER AND WHAT ARE ITS BENEFITS?

MetroLink would offer five new services. These are shown (with color-coding) for the entire **MetroLink** system in Figure 4 and detailed further in Figure 5 (Manhattan Upper East Side), Figure 6 (Manhattan Central Business District), Figure 7 (Brooklyn and Queens), and Figure 8 (The Bronx).

125th Street to Water Street and Jamaica (shown in black) – This service would start at 125th Street & Lexington Avenue, shift east to Second Avenue and proceed south to Water Street. From the foot of Water Street it would proceed under the East River through a new tunnel, run under State Street or Atlantic Avenue to Atlantic Terminal, and then join the tracks of the LIRR's Atlantic Branch. Trains would run to Jamaica Station from Atlantic Terminal with no stops. Length = 20.2 miles; Travel Time = 34.7 minutes; Number of Stops = 17

Benefits

- Gives Manhattan residents on the Upper East Side walking distance access to the subway system and service to east Midtown, lower Manhattan, downtown Brooklyn, and Jamaica. The service also provides for easy across-the-platform transfers to the other four new services, allowing for access to all of midtown and lower Manhattan, as well as major portions of Queens, Brooklyn, The Bronx and Kennedy Airport.

- Helps relieve crowding and improve service reliability on the Lex for riders in The Bronx, on the Upper East Side and in East Harlem.
- Offers LIRR commuters direct, fast, frequent, and reliable service to downtown Brooklyn and Lower Manhattan
- Sets up direct connection from Kennedy Airport to downtown Brooklyn and Manhattan
- Establishes direct service to east side for many Brooklyn residents, and with connections to N and R lines in lower Manhattan to still more Brooklynites
- Draws riders to lower Manhattan from the Upper East Side and Long Island with two new stations in the Water Street corridor

Co-op City to the World Trade Center and Whitehall Street (shown in blue) – This service would originate in a tunnel at Co-op City and then run at-grade southwest along Amtrak’s New Haven Line ROW, where there is space for two new transit tracks. It would continue down Boston Road and Third Avenue in a tunnel and then under the Harlem River to connect with the trunk line at 125th Street. It would stop at 125th Street & Lexington Avenue to allow transfers to and from the Lex and the “black” line, then run down Second Avenue on the Upper East Side, turn west at the existing 63rd Street tunnel and connect with the currently unused express tracks on the Broadway (N, R) Line. Trains would continue south using existing stations to Whitehall Street. This service would require that the N service be restored to the Manhattan Bridge, as is currently planned. Length = 17.9 miles; Travel Time = 37.8 minutes; Number of Stops = 23

Benefits

- Co-op City and Parkchester residents get direct high-speed service to midtown and lower Manhattan and to other points in the Bronx, such as the Hub at 149th Street and Melrose Commons. Travel timesavings from Co-op City to lower Manhattan approach one-half hour per trip.
- Gives Manhattan residents on the Upper East Side and in East Harlem walking distance access to the subway system and service to west midtown and the World Trade Center/City Hall area. The service also provides for easy across-the-platform transfers to the 125th Street to Jamaica service.
- Helps relieve crowding and improvement of service reliability on the Lex for riders in The Bronx, on the Upper East Side and in East Harlem.
- Connects much of the City to rapidly expanded Theater District area.
- Links dense residential areas of the Bronx with the Hub at 149th Street.
- Helps to revitalize Melrose Commons area.
- Provides job access to currently hard to reach Bronx Hospital Center area.

Grand Central Terminal to the Financial District and Brooklyn via Second Avenue (shown in brown). This service would begin at a new subway terminal under the lower level mezzanine at Grand Central Terminal. Commuter rail riders would be able to take an escalator directly to this new service. This line would connect to the Second Avenue line, make an intermediate stop, probably at 34th Street to allow cross-platform transfers to the 125th Street-Jamaica and Laurelton-

Gravesend services, and then run as an express directly to Lower Manhattan. These trains would serve the center of the Financial District by using the existing Nassau Street (J, M, and Z) Line tracks. The trains would replace the Brooklyn portions of the M service (which would terminate at Broad Street) and then run into and through Brooklyn on the West End Line (M) to Bay Parkway. This would require construction of the spur under the GCT as well as the construction of the portion of the Second Avenue line between 42nd and Delancey Streets as a four-track system. Length = 13.6 miles; Travel Time = 49.1 minutes; Number of Stops = 24

Benefits

- Gives Metro North riders headed for the center of lower Manhattan and to downtown Brooklyn a fast, uncrowded, comfortable and reliable ride. Travel time from Grand Central Terminal to Broad St. would be only 12 minutes.
- Offers southern Brooklyn residents of such communities as Bensonhurst and Sunset Park direct service to Manhattan's East Side.
- Offers easy across-the platform transfer for Queens residents using new line from Queens who are destined for lower Manhattan.

Grand Central Terminal to Water Street and Kennedy Airport via Second Avenue and the Atlantic Branch (shown in green). This service would serve the east side of the Financial District by running as an express (with a stop at 34th St.) from GCT to Water Street. It would use the new East River tunnel to connect to the converted Atlantic Branch at Atlantic Terminal and then run express to a connection with the Kennedy Airport *Airtrain* service that the Port Authority plans to build over the Van Wyck Expressway. Trains would turn south on the Van Wyck line and make all of the proposed Airtrain stops in the Central Terminal Area. Length = 20.1 miles; Travel Time = 32 minutes; Number of Stops = 6 or 7

Benefits

- Gives Metro North riders destined to the Water Street corridor in lower Manhattan and to downtown Brooklyn a fast, uncrowded, comfortable and reliable ride.
- Creates a one-seat ride to Kennedy Airport for Metro North riders, and from east Midtown, East Side communities such as Kips Bay and Stuyvesant Town, and from lower Manhattan and downtown Brooklyn. Travel time from Kennedy Airport to Grand Central Terminal would be just 32 minutes. Travel time from Kennedy Airport to Whitehall St would be 20 minutes.
- Makes possible a one-transfer ride from Kennedy Airport to the World Trade Center and to west midtown.
- Connects downtown Brooklyn directly to the East Side of Manhattan.

Laurelton to Gravesend: This service would serve the communities of Laurelton, Locust Manor and south Jamaica using the Atlantic Branch of the LIRR converted to subway standards and connecting with the existing subway terminus in Jamaica Center. It would then operate as a high-speed bypass along the Queens Boulevard line making express stops and using new fifth track segments (running parallel to the existing tracks) at Roosevelt Avenue in Jackson Heights and in Forest Hills. The service would then use the 63rd Street Tunnel to enter Manhattan, where it would turn south on Second Avenue. At 14th Street trains would turn east and run along 14th Street

(through a new tunnel) and then turn south onto Avenue C, serving the East Village and Lower East Side, before merging with the F line and running into Brooklyn via the existing Rutgers Street tunnel. In Brooklyn trains would run on the Culver express tracks and terminate at Avenue X in Gravesend. Length = 26.9 miles; Travel Time = 62 minutes; Number of Stops = 26

Benefits

- Avoids the tortuous, crowded and time-consuming transfers to the Lex at 59th and 53rd Streets for riders from the Queens Boulevard corridor.
- Gives southeastern Queens residents direct access to the subway, rather than the slow feeder bus service they currently use to reach the subway in Jamaica, saving them at least 15 minutes per trip.
- Brings the residents of the Lower East Side and the East Village within reasonable walking distance of the subway network, affording them direct access to east Midtown and other east side work locations.
- Offers residents in the Culver Line corridor in Brooklyn direct one-seat access and residents of other areas of Brooklyn easier access to Manhattan’s East Side.

WHAT MARKETS WOULD *MetroLink* SERVE?

The connectivity that ***MetroLink*** offers would make many trips by subway possible that are either impossible or highly unattractive today. In Figure 9 the new markets served are depicted in triangular matrix format with the individual cells representing markets. The filled in circle indicates that a new direct service would be provided; the open circle that a new cross-platform transfer would be possible. Of the 105 markets in the matrix, ***MetroLink*** would provide direct service to 35 of them and new transfer service to 25 others. In sharp contrast the MTA Second Avenue proposal would serve but four! ***MetroLink*** is especially strong in adding service for Lower Manhattan, with all of its markets gaining either direct or easy transfer service. East Midtown and the Upper East Side do almost as well.

Figure 9
Matrix of Markets Served by MetroLink

	Long Island	Westchester/ Connecticut	JFK Airport	The Hub	Parkchester	Co-op City	Queens Boulevard	Southeast Queens	South Brooklyn	Downtown Brooklyn	Lower Manhattan	Lower East Side/ East Village	West Midtown	East Midtown
Upper East Side			○	●	●	●	○	○	○	●	●	○	●	●
East Midtown			●	○	○	○	●	●	●	●	●	●		
West Midtown			○	●	●	●					●			
Lower East Side/ East Village	○		○				●	●	●	●	○			
Lower Manhattan	○	○	●	●	●	●	○	○	●	●				
Downtown Brooklyn	○	○	●	○	○	○	●	○						
South Brooklyn		○					●	○						
Southeast Queens							●							
Queens Boulevard														
Co-op City				●	●									
Parkchester				●										
The Hub														
JFK Airport		○												
Westchester/ CT														

● Direct Connection

○ Cross-Platform Transfer

HOW MUCH TIME WOULD MetroLink SAVE?

MetroLink will mean substantial travel time savings for riders traveling throughout New York City. In Table 1 **MetroLink** travel times are compared with times for some of today's representative trips. Many trips to Manhattan from the boroughs of the Bronx, Brooklyn and Queens will be shortened by a half-hour, with trips times cut in half. Trips within Manhattan will be shaved substantially too, with especially large savings for Upper East Side and Lower East Side residents who will save upwards of 20 minutes on many trips. While the trip time from GCT to Lower Manhattan does not seem much shorter than the Lex, the improved reliability will give Metro North riders greater confidence that they can make their commuter trains in the evening. And trips to Kennedy Airport will be reduced to a mere twenty minutes, slashed from an hour or more. Moreover, the savings are likely to be even greater since many of today's trips by transit are subject to crowding-induced delays, a situation that will be eliminated with **MetroLink** in place.

Table 1: MetroLink Travel Time Savings

Origin/Destination	Current Trip	New Trip on MetroLink	Time Saved	Assumptions for Current Trip
86th St & Second Ave to Wall St & Water St	34	16	18	10 minute walk to Lexington Ave & 86th St + 5 minute walk from Broadway & Wall St.
GCT to Nassau St & Wall St	18	17 ²	1	5 minutes to transfer from Metro North
GCT to Kennedy Airport Terminal One	78 ³	32	46	Transfer from Lex to A Train at Broadway/Nassau & To Port Authority Bus at Howard Beach
Whitehall & Water Street to Kennedy Airport Terminal One	53 ³	20	33	A Train to Howard Beach and Transfer to Port Authority Bus
125th St & Lexington Ave to Herald Square	28	15	13	10 minutes to Transfer at 59 th St
Lower East Side to 44th St & Second Ave	27	9	18	5 minute transfer at Bleecker/Lafayette + 10 minute walk from GCT.
Co-op City to City Hall	63	34	29	Assumes 15 minutes for bus trip to Dyre Ave Line
Parkchester to Whitehall St (Broadway Line)	45	31	14	Current trip would terminate at Bowling Green
Jamaica Center to 44th St & Second Ave	42	33	9	10 minute transfer from E to #6 at 51st St
Jamaica to Water St & Whitehall St	54	15	39	5 minute walk from Broad St
Kings Hwy & McDonald Ave to NYU Medical Center @ 33rd St & First Ave	55	24	31	Assumes completion of Bleecker/Lafayette Connection. 5 minutes to transfer at Bleecker/Lafayette + 10 minute walk from 33rd St
Bay Parkway & 86th St (Brooklyn) to Chrysler Building	55	49	6	10 minute transfer at Pacific/Atlantic Ave.

1. Observed trip times frequently exceed currently scheduled times.
2. Includes 5 minutes for transfer from commuter rail.
3. The Port Authority's Airtrain system will offer light rail service from the LIRR Jamaica station and the A Train Howard Beach Station. These improvements, along with the Grand Central Terminal connection to the Long Island Railroad will reduce travel times from Midtown to about 45 minutes and from Lower Manhattan to about 48 minutes.

How Much Would Overcrowding Relief Would MetroLink Provide?

The MTA has run sophisticated computer models intended to project the impact on peak hour ridership on the Lexington Avenue express and other subway lines if various alternatives were built. These models assume a 9.5 percent ridership growth for the subway system for 25 years from 1995 to 2020, or an annual rate of less than 0.4%. In sharp contrast, ridership has grown by 21% since 1992 – or 3.3% per year. Because ridership tracks so closely with employment, RPA is projecting ridership to increase from 1995 to 2020 at the rate of employment growth -- 20.5 percent, or 0.8% per year. Table 2 shows the peak hour ridership volumes on the Lexington Avenue express morning on trains between 86th Street and 59th Street between 8am to 9am using the 1996 Hub-bound volumes assembled by the New York Metropolitan Transportation Council with data provided by the MTA. Also shown are the number of trains and cars operated and the

average square feet of space available per person. Four square feet per person is the standard used by the MTA. Note that in 1996 the Lex express was well below that standard with only 3.1 square feet per person. Note also that only 23 trains in the peak hour were operated in 1996, even though the Lexington Avenue express has operated more in the past. Crowding on the platforms and entering and exiting the trains at key stations keeps the train throughput down.

If no Second Avenue subway of any type were built by 2020, then potential ridership on the Lex would grow from 33,600 to 40,500 given RPA’s growth assumption. But since passengers will be unwilling to tolerate crowding down to the 2.6 square feet per person, a level barely possible in a physical sense, these conditions are unlikely to exist at all, as employment growth would be stunted. Moreover, at such crowding levels even 23 trains an hour would be highly problematic as dwell times increase and service reliability is reduced intolerably along the entire length of the line.

While it is not possible to discern the diversion of riders from the Lexington Avenue express projected by the MTA with any certainty, it would appear that an estimate of 20 percent is reasonable, given the absence of any direct east Midtown access with the MTA’s MESA proposal (see box). A diversion of 20 percent, and allowing for a slight addition to train throughput from 23 to 24 trains per hour would still leave Lexington Avenue riders below the MTA minimum standard of 4.0 square feet per person. In sharp contrast is **MetroLink**. Because it would divert riders destined for both the East and West Side, a 40 percent diversion from the Lex would be a conservative estimate. As Table 2 shows, under these circumstances the Lex would have a comfortable space per person of 5.2 square feet.⁶ Table 2 strongly suggests that the MTA Second Avenue subway would leave the Lex about as crowded as it is today with no room for growth, and that **MetroLink** would offer Lex riders of 20 years from now a comfortable and humane ride.

Table 2: Lexington Avenue Express Morning Southbound Peak Hour Conditions Between 86th Street and 59th Street

	Riders	Number of Trains	Number of Cars	Square Feet per Person
Current	33,600	23	230	3.1
2020 with 20.5 % Growth	40,500	23	230	2.6
2020 with MTA Second Avenue Subway	32,400	24	240	3.3
2020 with MetroLink	28,900	28	280	5.2

⁶ The space standard adopted by RPA in its seminal work on rail transit, Urban Rail in America, Indiana University Press (1980) was 5.4 square feet per person.

Why the MTA s Partial Second Avenue Subway from 125th Street to 63rd Street is Inadequate

The MTA s Manhattan East Side Alternatives (MESA) study is leaning toward a recommendation for a north subway to be built from 125th Street and Lexington Avenue, which would swing over to Second Avenue and run down as far as 63rd Street, where it would connect with the existing 63rd Street cross-town tunnel. Service would then run along the Broadway (N, R) line as far as City Hall.

The MTA plan would not:

- allow Upper East Siders to use the Second Avenue line to reach east Midtown, since the line would veer off to the west side, thus leaving them just as far from a useful subway stop as today.
- give sufficient relief from overcrowding to riders on the Lex.
- give Queens riders access to East Midtown.
- add service to the eastern edge of lower Manhattan along Water Street, where many new office buildings have been built in the last few years.
- provide benefits to riders from the Lower East Side, Brooklyn and Queens, and only indirect and minimal benefits for Bronx residents.

WHAT CAPITAL INVESTMENTS WOULD BE NEEDED FOR *MetroLink*?

MetroLink will require a major capital investment, including approximately **19** miles of new subway tunnel, 31 new stations, plus four converted from LIRR, storage yards, and 950 new Rx rapid transit cars. By making use of elements of the existing subway and commuter rail network that are either unused or not used to their fullest potential, ***MetroLink*** will add to the value of the newly built portions of the transit network

The Trunk Line. At the core of ***MetroLink*** is the trunk line running the length of Manhattan from 125th Street to the Battery and in a new tunnel under the East River to Atlantic Terminal in Brooklyn. The alignment would run diagonally from Lexington Avenue and reach Second Avenue at about 118th Street . Two tracks would run down Second Avenue using a deep tunnel from 118th Street to 42nd Street.

Two express tracks coming from the GCT spur would turn south onto the Second Avenue Line in the vicinity of 43rd Street to make a four-track line and continue south. The local and express tracks would stop at 34th Street to allow across-the-platform transfers among four ***MetroLink*** services. All four tracks would continue south along Second Avenue with a turnout from the local tracks at 14th Street to connect to the new East Village and Lower East Side subway. The Second Avenue line would continue south to Chrystie Street where an express track turnout at Delancey Street would connect to the existing Nassau Loop (J, M, Z) to run through the center of the Financial District. The two express tracks would connect with the Nassau Loop and the two local tracks would continue south of Delancey and run under Pearl and Water Streets, serving the eastern portion of Lower Manhattan. At a new station between Whitehall and Broad a transfer

would be constructed to the N and R line one block to the east.

A new East River tunnel would be constructed from the new Whitehall Street station of the Water Street line. In Brooklyn the line would extend to a station in the vicinity of MetroTech and Borough Hall and then connect to Atlantic (Flatbush Avenue) Terminal, where it would connect to the LIRR Atlantic Branch, which would be converted to transit use. The total length of this tunnel (from 125th Street to Atlantic Terminal would be 10.9 miles (8.6 miles would have two tracks, and 2.3 miles would have four tracks).

The Grand Central Spur. A two-track spur to Second Avenue would begin under the lower level mezzanine in Grand Central Terminal. Escalators would run directly down to the new **MetroLink** station. The tracks of this spur would then run east under 43rd Street for 0.4 miles and then turn south under Second Avenue and run as an express with a stop at 34th Street to allow for cross-platform transfers. A turnout at Delancey Street would connect to the Nassau Loop for one service. The express tracks would connect to the local tracks to Water Street and continue south.

The Lower East Side and East Village Line. A turnout would be constructed at 14th Street for the local tracks to connect to a new line that would head east and then turn down Avenue C. It would run down Avenue C and Pitt Street and then turn south on East Broadway before connecting to the Rutgers Street tunnel (F line) and proceeding into Brooklyn. The new subway segment would be 1.2 miles long.

Broadway Line Improvements. To run the Co-op City to Whitehall Street service on the Broadway express tracks, it will be necessary to make some substantial improvements to the Broadway Line. The most substantial improvement would be a new interlocking at Canal Street on the Broadway Line (N, R), to allow **MetroLink** trains and N trains to “flip-flop” between local and express tracks below Canal Street.

Queens Line Improvements. A connection between the Second Avenue line and the 63rd Street line from Queens would be constructed to allow for westbound to southbound and for northbound to eastbound train movements. Bypass tracks would be constructed on the express tracks of the Queens Boulevard Line (E, F) at the express stations in Jackson Heights and Forest Hills. These bypass tracks will run parallel to the existing tracks and increase the capacity on the Queens Boulevard Express, allowing for the addition of the **MetroLink** service running down Second Avenue. The Archer Avenue line (J, Z, E trains) in Jamaica would be extended a short distance to connect with the Atlantic Branch of the LIRR to Laurelton (commuter rail service at Laurelton and Locust Manor would be replaced with more frequent subway service), a distance of 3.7 miles. This would likely also involve construction of at least one additional track on either the Montauk or Atlantic Branches to accommodate the needs of the LIRR.

Conversion of the LIRR Atlantic Branch to Rapid Transit. **MetroLink** would convert the LIRR Atlantic Branch, running from Jamaica to Atlantic Terminal (Flatbush Avenue) in Brooklyn, to be compatible with the subway and with the Kennedy Airport *Airtrain*. This will allow **MetroLink** to run trains out to Jamaica Terminal, giving LIRR riders a high-speed connection to Lower Manhattan, and providing a connection for a one-seat ride from Manhattan and downtown Brooklyn to Kennedy Airport. This upgrade will require the connection of the Atlantic Branch to a new tunnel coming from the foot of Water Street in Lower Manhattan. The Atlantic Branch will also require track and communications improvements to bring it up to NYCT standards. A new junction will be constructed to connect the Atlantic Branch to the Kennedy Airtrain in the vicinity of the Van Wyck Expressway, making possible the one-seat ride from Kennedy Airport to

Manhattan and downtown Brooklyn.

The Bronx Line. At 125th Street a new two-track subway tunnel would be built north under the Harlem River. It would extend up Third Avenue in The Bronx and at 169th Street under Boston Road. The tunnel would emerge from underground at West Farms and use Amtrak's ample at-grade right-of-way on the New Haven Line. South of Co-op City the line would enter a new tunnel under Interstate 95 and extend to the western edge of Co-op City. This project would connect the Second Avenue/Broadway line service to Co-op City. It would require 6.4 miles of new tunnel and 3.1 miles of at-grade tracks.

New Vehicles: The new services provided by ***MetroLink*** will require the addition of approximately 950 new hybrid Rx vehicles. This requirement was calculated by developing a peak period service plan, which assumes each new line would run from 10 to 15 trains in the peak hour. A 15% spare and maintenance requirement was also assumed. (These calculations currently under review).

New Yard Space: The new trains will need to be stored in the off-peak periods. This space will need to be built as an expansion to an existing yard or as a new facility.

WHERE WOULD THE NEW *MetroLink* STATIONS BE LOCATED?

Selecting the best location for new stations on these proposed new lines is critical to their success. Many considerations are involved including:

- Maximization of the number of people that are living within reasonable walking distance of the subway system. A corollary measure is the number of people living within reasonable walking distance of the new line. Both are valuable measures of effectiveness of the additional line. The distinction can be explained best by example. Someone living at 86th and East End Avenue would be added to the pool of persons living within walking distance of the subway system with ***MetroLink*** in place. On the other hand, someone living near the corner of 86th Street and Third Avenue would certainly be within walking distance of a ***MetroLink*** station at 86th and Second Avenue, but they would not be an addition to the pool of persons living within walking distance of the subway system since they are now only a few hundred feet from the existing Lexington Avenue station. They would gain by the added options for using the system, however.
- Maximization of the number of non-residential activities, often measured by the number of jobs within reasonable walking distance of the subway system or of the new line, as above.
- Availability of and potential for connecting bus routes. Locations where bus service exists, or would otherwise be feasible because of sufficient cross-street widths and sizable ridership, new subway stations would have a built in feeder service to the subway. Such locations are preferable, e.g., on the Upper East Side on 72nd Street or 86th Street.
- Potential for new development or redevelopment in the vicinity of stations that could be spawned by the new access to transit service. In some possible station locations there are opportunities to create new residential or non-residential development or upgrade existing land uses consistent with community desires. Locations in the Central Bronx come to mind.

- Ease and expense of construction at the location. At some locations it may be difficult to build stations because of other underground structures or adverse geological or hydrological conditions. Constraints because of exceedingly deep tunnels, track merge points, curves or steep slopes may also limit choices. In the case of the portion of **MetroLink** on Second Avenue, an added factor may be the effect of the construction already completed from the aborted efforts to build the Second Avenue subway in the 1970's.

In addition to these situational factors, consideration must be given to the number of stations to be established on the new line. Here a classic trade-off exists. More stations mean more people have easy walking access. But more stations also means more stops that slow the service. Compromises will be necessary. To inform that process, the riders who have their walking distances reduced and by how much should be compared with the number of riders who lose how much travel time with added stations. Consideration also must be given to the higher operating costs and greater fleet needs that are inevitable from slower service. Counterbalancing this is the potential station crowding if riders are concentrated at fewer stations.

Given all these considerations, some preliminary judgments about station locations are presented here. In some cases where there are special considerations the stations are described to suggest exits that are up to four blocks apart to account for both the length of the trains and the depth of the stations. These suggested station locations would be the subject of extensive discussions with the communities involved.

In Manhattan:

125th Street and Lexington Avenue – This station would serve as the transfer point between the existing Lexington Avenue subway and **MetroLink**, thereby offering riders from the West Bronx (#4) transfer options to the lines under Second Avenue. Similarly, riders of **MetroLink** in the Bronx would be able to transfer to the Lexington Avenue express or locals trains. One service using this station would come from the Bronx and the other would start at 125th Street.

116th Street and Second Avenue – This station offers a station in the center of East Harlem at a cross-town street with bus service and a potentially vibrant and growing retail center. The MTA proposal does not contemplate a station at this location.

106th Street and Second Avenue – This station would offer the same advantages as the one at 116th Street, but a half mile further south in East Harlem.

96th Street and Second Avenue – This station would serve Metropolitan Hospital at 97th Street and Second Avenue and would also serve the many high rise apartments that have developed on First, York and East End Avenues just south of 96th Street.

86th Street and Second Avenue – This station is a natural location, given the strong retail center along 86th Street and the cross-town bus service. The station would have its major exit and the north end at 86th Street with exits as far south as 82nd Street to shorten the spacing to the next station to the south.

72nd Street and Second Avenue – A station at 72nd Street with entrances on 74th and 70th as well. The 70th Street entrance would serve the hospital complexes on York Avenue in the upper 60's.

55th Street and Second Avenue – This station would serve the concentration of midtown office buildings in the mid-50's and the residences to the east. The north end of the station would exit onto 57th Street and the south end could be connected with pedestrian passageways to the eastern end of the 53rd Street IND Station at Third Avenue, offering added travel flexibility and relieving the horrendous crowding at the transfer between the 53rd Street cross-town route and the Lexington

Avenue line. The station would also be used as a transfer point between the new service coming down Second Avenue and the new service from Queens.

44th Street and Second Avenue – This station would serve the office concentrations in the mid 40’s, the United Nations area, and the residential concentrations of Turtle Bay. It would also serve as a transfer point for the Queens service using the East River tunnel under 63rd Street that turns down Second Avenue and for the Second Avenue services beginning north of 63rd Street in East Harlem and the Bronx. Connections to the 42nd Street cross-town buses would be possible.

Grand Central Terminal – This station would act as a terminus for two services to lower Manhattan. It would be built under the lower level of Grand Central Terminal, reached by an escalator ride by Metro North riders.

34th Street and Second Avenue – This station would be a major transfer point among all the ***MetroLink*** services on the east side, enabling across-the-platform transfers. Riders from the Second Avenue service from 125th Street and from Queens service could transfer to the express from GCT, and GCT riders could transfer to the Second Avenue service to reach local stops. Existing cross-town bus service would act as a feeder. The station would serve the Murray Hill and Kips Bay neighborhoods and the NYU and Bellevue Medical Centers.

23rd Street and Second Avenue – This station would be a local stop, with the GCT express services skipping the stop. It would provide subway access for the Gramercy Park neighborhood and Peter Cooper Village.

14th Street and Second Avenue – This station would be local stop also and serve Stuyvesant Town, the northern edge of “Alphabet City” and the East Village. It would be possible to transfer to the 14th “L” line and to cross-town bus services.

Houston Street and Second Avenue – This local station would serve the eastern edges of Soho and Noho and the Bowery.

Canal Street and the Bowery – This station would serve Chinatown.

Wall Street/Fulton Street and Water Street – This location would be one of two stations in the financial district south of the Brooklyn Bridge. This station would serve the eastern edge of the financial district and the South Street seaport. Exits would be located at Fulton Street on the north end and Wall Street to the south. It would also serve the ferry services at Pier 11.

Whitehall/Broad Street and Water Street – This station would serve the southern tip of Manhattan’s financial district and the Staten Island ferry. A transfer station with the Whitehall Station of the N and R lines would provide substantial connectivity among services.

First Avenue and 14th Street – This station would be one of the three stations on the ***MetroLink*** line serving the East Village and the Lower East Side. This station would allow transfers between it and the existing L line from Brooklyn that serves today as the 14th street cross-town service. The station would increase the accessibility of Stuyvesant Town, located between First Avenue and Avenue C.

Avenue C and East 8th Street – This station would stretch from 7th to 10th Streets and would serve the heart of the East Village (Alphabet City), a neighborhood long beyond reasonable walking distance to the subway system.

Houston and Avenue C – This station, together with the following one, would do an excellent job of serving the high concentration of residences on the Lower East Side currently well beyond walking distance to the subway system.

East Broadway and Pitt Street – This station would also serve the Lower East Side well.

In the Bronx:

Co-op City North – This is one of three stations serving Co-op City, collectively offering all residents a one-third of a mile or less walk to the subway line. This station would be located under the small retail and community service area at Dreiser Loop in Co-op City's western section.

Co-op City Central – This station would be located under Bartow Avenue and serve a major portion of Co-op City, the convenience shopping center on the west side of Bartow and the new shopping mall developments on the east side of Bartow Avenue.

Co-op City South – This station would be located just east of the Hutchinson River Parkway opposite Einstein Loop in the eastern section of Co-op City.

Bronx Municipal Hospital Center – This station would offer subway service for hospital workers and visitors to the complex of hospitals along or near both Eastchester Avenue and Pelham Parkway.

White Plains Road and East Tremont Avenue (Parkchester) – With this station Parkchester residents would have an easy walk to **MetroLink**; the internal street pattern of Parkchester feeds directly to the proposed station location. Today, Parkchester residents on its western edge have a long walk to the subway. The station would also offer service to residents living to the west along or near White Plains Road.

West Farms Road and East Tremont Avenue – This would serve the East Tremont neighborhood and offer a transfer to the White Plains Roads Road/Westchester Avenue #2 line and the Dyre Avenue line and serve the Bronx Zoo's southern entrance. Cross-town bus service would provide connections.

Boston Road and 169th Street – This station would serve East Tremont and add subway service to a neighborhood that lost it with the closing of the Third Avenue a quarter a century ago.

Third Avenue and 161st Street – This station would offer service to the Melrose Commons area undergoing revitalization and assist in furthering that goal. It would put the subway system within walking distance of a neighborhood without subway service for the last 25 years.

Third Avenue and 149th Street (the Hub) – This station would feed the commercial hub of the south Bronx and serve as a transfer from the existing #2 and #5 lines, siphoning off riders from these crowded services to the new **MetroLink** line running down Second Avenue.

In Brooklyn:

Metro-Tech/ Borough Hall – This station would be in the heart of the revitalized Metro-Tech area, within three blocks of Borough Hall and one block from the Fulton Street shopping district.

Atlantic and Flatbush Avenues – This station would be located at the existing Atlantic Avenue Terminal of the Long Island Rail Road, where numerous connections to other subway lines would be possible.

In Queens:

Laurelton – This station, currently a stop on the LIRR would serve as the terminus of the

Southeast Queens extension of ***MetroLink***

Locust Manor – This station, located near the large and dense Rochdale housing complex, is also a current stop on the LIRR.

Linden Boulevard – This would be a totally new station on what is now the Atlantic Branch of the LIRR.

BUILDING *MetroLink*: HOW LONG, HOW MUCH?

MetroLink should be built and financed in its entirety, as a single package. The target date for its completion should be 2012, the same date the Long Island Rail Road connection to Grand Central Terminal is scheduled for completion. The two projects would be done in parallel and completed at the same time, to protect against the added crushed of 19,000 riders daily on the Lex, that MTA currently forecasts from the LIRR connection. An aggressive construction schedule would also produce more benefits faster, while lowering the overall construction cost.

Ambitious schedule proposals for modern infrastructure projects are often dismissed with a kind of knowing cynicism that anything built in New York takes forever. But between 1900 and 1940, New York built an average of six miles of subway per year every year for forty years. Overseas, new tunnel boring technologies are now being regularly used to accelerate underground rail transit construction by minimizing community disruption and greatly reducing the geo-technical problems that traditional cut and cover tunnel construction creates. **MetroLink** lends itself to using such new methods to construct several segments in tandem,. These factors suggest that a feasible progress goal for **MetroLink** would be two miles of tunnel and a mile of surface construction every year, making the 2012 target for **MetroLink** completion a reasonable one.

Based on experiences elsewhere with the construction of new rapid transit systems, and allowing for the complexity in New York of adding to an existing network that must continue to operate as construction proceeds, RPA has developed a rough cut cost estimate to build and equip **MetroLink**. Table 3 breaks these costs out by general category. The total cost is estimated at just under \$13 billion to built over a thirteen year period between now and 2012, an excellent value given that **MetroLink s** many benefits will be with us for 100 years or more, and that it will boost our economy. The price is affordable in the context of our annual gross regional product, now approaching 800 billion dollars.

Table 3: *MetroLink* Rough Cut Capital Cost Estimate

Items	Unit	Unit Cost (\$ million)	Units	Total Cost (\$ million)
Tunneling (two-track)	per mile	350	16.5	5,775
Tunneling (four-track)	per mile	600	2.4	1,440
New Surface Tracks	per mile	25	3.0	75
Upgrade Atlantic Branch	per mile	20	13.0	260
Stations	each	75	33	2,475
Broadway Line Improvements	lump sum	100	N/A	100
Queens Boulevard Line Improvements	lump sum	450	N/A	450
New Connection to <i>Airtrain</i>	lump sum	100	N/A	100
Rolling Stock	per vehicle	1.3	950	1,235
Yard Capacity	per vehicle	1.0	950	950
Total				12,860

NOW IS THE TIME TO ACT

All the problems of the subways, the inhumane crowding on the Lex, Queens Boulevard, and so many other lines, the extra long and circuitous daily trips for many tens of thousands of workers, the lack of service to residential areas built up after World War II, the mismatch of existing access to Downtown Manhattan with the needs of today's travelers, the lack of a one seat ride from Kennedy Airport, are but symptoms of two basic problems. The current subway system is undersized and outdated. **MetroLink** would add that needed capacity and modernize its network with a series of new direct connections, enhancing the City's future job growth, and greatly improving its quality of life.

MetroLink is a project of dramatic scale because a dramatic increase in subway capacity is essential to the City's economy and quality of life. The alternative to adding this new capacity is an increase in the already sardine-like crowding on the most heavily used lines, such as the Lex and the trains serving the Queens Boulevard corridor. Service reliability will further deteriorate, especially during rush hour, and future gridlock cannot be ruled out. How the City would realize its full potential for future economic growth under such circumstances is difficult to imagine.

Many may be initially intimidated by the price tag for this new system at a time when major investments in maintaining the existing subway system and the long overdue LIRR/GCT connection must also be funded. **MetroLink** will cost \$13 billion and will take 13 years to build and equip. But **MetroLink**, like other major transit investments will pay back its investment for 100 years or more, making it an excellent value. Trying to compete in the emerging 21st Century global economy, trying to provide a 21st Century quality of life with a subway system designed for the 1930s will cost the City and the Region far more. That is why other world cities, including Paris, London, Tokyo and Hong Kong, are investing tens of billions of dollars to modernize and expand the capacity of their rapid transit systems. Only then can they ensure and maximize future economic growth.

We cannot afford to be blind to the economic stagnation that will come if new rapid transit capacity is not made available. Act on **MetroLink** or strand the subway system between ridership-promoting innovation and economic growth on one side and blindness to its capacity implications on the other. It takes ten years to design and build a new subway system. In ten years the City will hopefully be celebrating continued economic growth, commensurate increases in employment, and completion of the LIRR/GCT connection. But, for all that to happen, **MetroLink** must happen too, or the celebration will be a short one.