ARC & NYC

THE NEW TRANS HUDSON RAIL TUNNEL: MAKING IT WORK BEST

A Report by

Regional Plan Association

March 2008

This report is dedicated to the memory of
George Warrington.

George had a clear vision of the New York-New Jersey metropolitan region's transit needs, and worked for over thirty years to achieve those ideals. He started working for NJTRANSIT at its inception in 1979, and later became the President of Amtrak. As the Executive Director of NJTRANSIT from 2002 to 2007, he tirelessly advocated for a new Hudson River commuter rail tunnel, known as Access to the Region's Core (ARC). He persuaded the leadership of both New Jersey and New York to move the project forward. ARC would not be happening without him.

His dedication and passion for improving public transit in our region and across the country will be profoundly missed.

Table of Contents

Acknowledgements

Regional Plan Association would like to thank The Nicholson Foundation for its generous support for this project.

Research and Analysis:
Jeffrey M. Zupan
Richard E. Barone

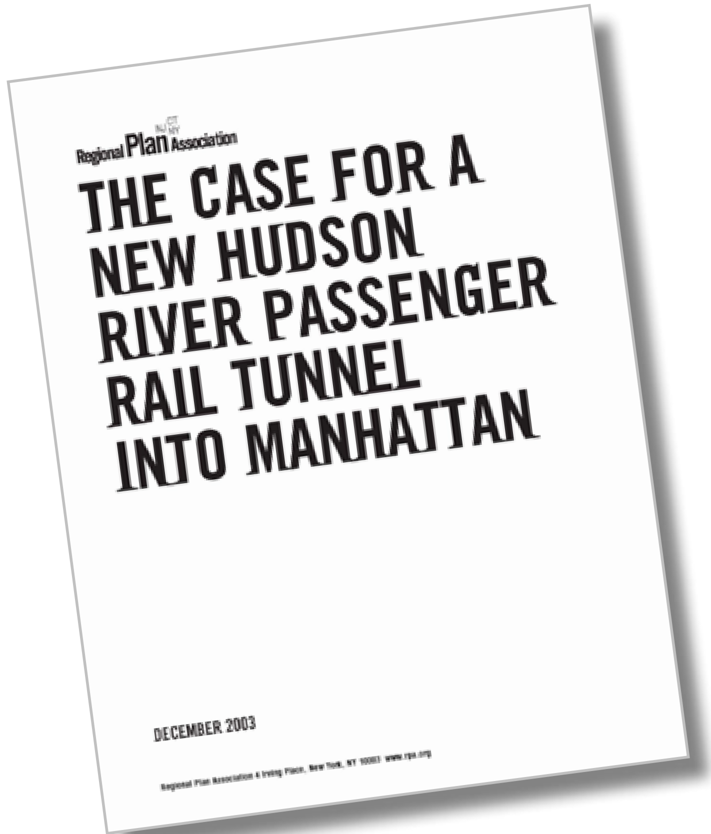
Text:
Jeffrey M. Zupan
Christopher Jones
Richard E. Barone

Editing:
Neysa C. Pranger

Design:
Jeff P. Ferzoco
Benjamin Oldenburg

Introduction

This report updates and expands on the December 2003 report by Regional Plan Association, *The Case for a New Hudson River Passenger Rail Tunnel into Manhattan*. It reinforces the arguments made in that earlier report about the value of the tunnel and the advantages of extending it within Manhattan. This issue is entwined with two others, also discussed here:


Regional Plan Association

THE CASE FOR A NEW HUDSON RIVER PASSENGER RAIL TUNNEL INTO MANHATTAN

DECEMBER 2003

2003

- What is the best way of improving Midtown Manhattan circulation?
- How should the new tunnel be most effectively used?

Executive Summary

For the tri-state metropolitan region to thrive, its center must thrive, too. This means that it must be possible to reach its core, which is Manhattan below 60th Street.

The simple fact is that for the last generation, the vast majority of new commuters coming into Manhattan have been coming from the west, across the Hudson River. Between 1980 and 2000, eighty-nine of every one hundred new commuting trips into Manhattan from the suburbs came from the west. During that same period, congestion on the bridges and tunnels which bring cars and buses into Manhattan has only gotten worse. And no amount of new highway capacity will ever remedy that.

Access to the Region's Core (ARC) will build a new commuter rail tunnel under the Hudson River connecting to a station under 34th Street and 7th Avenue, doubling the region's rail capacity from the west. Planned by NJ TRANSIT and the Port Authority of New York and New Jersey, ARC would add more than 60,000 additional seats for commuters, enough for the next generation of regional growth. This increase in capacity will assure New York City's continued access to the educated labor force in New Jersey and New York's Orange and Rockland counties.

ARC will provide important access to New York City's new business district on the Far West Side, growing the City and State's economy. It will provide one-seat rides into Manhattan from four transit lines, and could even open up options for new transit services across New Jersey.

Access to the Region's Core will have tremendous benefits for New York, New Jersey, and the entire northeast Megaregion. This report explains how these benefits can be expanded by considering a second phase of the project connecting to Manhattan's East Side.

This report examines three aspects of Access to the Region's Core (ARC):

➜ **Section A**: How it might be expanded to other parts of Manhattan.

➜ **Section B**: How it fits in with planned improvements in Midtown circulation.

➜ **Section C**: What commuter rail services might use the added capacity best.

The ARC project will cost approximately $7.5 billion dollars, with funding from the Port Authority of New York and New Jersey, the State of New Jersey and the federal New Starts Program. Construction of ARC is scheduled to begin during the fourth quarter of 2009 and be completed by 2017. The project includes two single track rail tunnels originating at the Hackensack Meadowlands and continuing under the Hudson River to a station beneath 34th Street centered on Seventh Avenue. This stand-alone project will create needed capacity acoss the Hudson, the first added capacity in 46 years since the second deck on the George Washington Bridge was added. Once ARC is in place it opens the way for future options to reach the east side of Midtown Manhattan.

In 2003, RPA released a study entitled, *"The Case for a New Hudson River Passenger Rail Tunnel into Manhattan,"* which called for an extension of the ARC in a loop configuration with four stations in Midtown – at the 34th Street location, on the east side under Madison Avenue, in the Rockefeller Center area and on the Far West Side (FWS). RPA saw this as an opportunity to provide a direct one-seat ride to more of the jobs in Midtown than would the one-station configuration (see Figure 1).

In this report the potential ridership and cost effectiveness of this loop configuration is examined at a level of detail not possible at the time the earlier report was written. Based on this analysis, RPA has concluded that the extension of ARC is warranted only for the first of the original three additional stations, the one under Madison Avenue. Consequently, we now recommend that the ARC project only be extended to the East Side under Madison Avenue, or to some other location on the east side. If the agencies could reach an agreement, this location could be within Grand Central Terminal.

The second issue discussed in this report is the relationship between ARC and other transit projects to improve circulation within and into midtown Manhattan. The development of the Far West Side (FWS), with the potential for construction of space for over 136,000 new office workers and 27,000 new residents, raises the question of access to the area and its relationship to current and future plans to improve Midtown circulation. This report concludes that although the proposed extension of the #7 Flushing line would substantially improve access to the FWS, other complementary projects should be considered. The #7 extension would not solve the circulation problems within the district, and since it would not link the Penn Station area to the FWS, other options should be considered. These projects could include the possibility of a light rail surface loop – first proposed in the RPA Third Regional Plan, *A Region at Risk*.

Moreover, since the construction of the #7 extension may require considerably more than the $2 billion pledged by New York City, and therefore become an additional burden on the MTA capital program, there is a possibility that it might be delayed or scaled back. The initial phase of the project is already being scaled back and will include only a single station at 11th Avenue and 34th Street , with the second planned station at 10th Avenue and 41st Street postponed, unless the additional funds are dedicated. If the #7 extension were to stall, the issue of FWS access and midtown circulation would have to be rethought.

Finally, this report focuses on how the additional rail capacity might be best utilized with either (a) additional service on existing lines already with direct one-seat ride service; (b) new one seat ride service on lines currently requiring a transfer; (c) rail service on new or long abandoned rail lines, or (d) some combination of the above. The report suggests a process that NJTRANSIT might use to best decide on how to allocate ARC's new capacity.

A

The Commuter Rail Loop

Table 1. Time on Loop

In Minutes by Direction with Average Time

Station	Inbound	Outbound	Average Time
34th Street & Seventh Avenue	0	15	7.5
Madison Avenue & 45th Street	5	10	7.5
50th Street & Seventh Avenue	10	5	7.5
Tenth Avenue & 38th Street	15	0	7.5
All egress and access to street	*3*	*3*	*3*

In the earlier report RPA argued that a new commuter rail tunnel was needed because of the continued rapid growth of travel between New Jersey and Manhattan. A new tunnel is the only feasible way to double the capacity of the existing rail system. The report further argued that the alternative configurations proposed by NJ TRANSIT (NJT) at that time were insufficient because they did not continue directly to the East Side of Midtown, where large numbers of west-of-the-Hudson commuters were destined.

To remedy this, RPA proposed that the tunnel be continued as a loop under Midtown: in addition to stopping at 34th Street at Seventh Avenue, it would extend to the east side with stops along Madison Avenue; then loop back across 50th Street, stopping near Rockefeller Center; and then on the far west side of Midtown, before returning to Penn Station. The loop would not extend directly into Grand Central Terminal, thereby avoiding impacts on the Metro North operations there. And by being physically separated from Penn Station, it would provide for easier maintenance of both existing and new facilities and redundancy in the event of emergencies.

At the time, NJT had been focusing on two alternatives for the new tunnel, one with a new station under Penn Station and the other with a stop on the south side of Penn Station, and then continuing to a yard in Sunnyside, Queens, via a new tunnel under the East River. Neither would serve the east side of Midtown; both had numerous other flaws. RPA's proposal, though not embraced by NJT, nevertheless raised the idea of a station under 34th Street, which inexplicably had not been part of the agency's early search for an alignment.

The 34th Street station alignment was studied by NJT during the Environment Impact Statement (EIS) process, and the 34th Street station location was subsequently approved by NJT's Board of Directors. NJT has secured $3 billion of Port Authority of New York and New Jersey funding and $1.5 billion from the State of New Jersey for the $7 billion project, and is seeking federal funding through a Full Funding Grant Agreement (FFGA). The EIS has been approved by the Federal Transit Administration, paving the way for an FFGA, which will guarantee that the federal government will pay for a negotiated percentage of the project's cost.

During the EIS process, NJT examined RPA's loop concept and found nothing that could prevent its eventual construction. However, NJT rejected the loop because of the additional cost, arguing that it would be difficult enough to secure the funding for the tunnel and the single station under 34th Street. Therefore, the agency did not take the loop to a level of preliminary design, nor did it estimate the ridership it would serve or the travel benefits that would accrue to the public. Nevertheless, NJT concluded that the design of the tunnel and station under 34th Street would <u>not</u> preclude the extension of the project eastward in the future.

A possible loop alignment is shown in Figure 1 and described below. Utilizing this loop, commuter trains would enter Manhattan through two new single track tunnels. Under this concept, the inbound tracks would split into two sets of tracks as it approached the first stop sited under 34th Street and centered on Seventh Avenue. This location would optimize transfers to the eight subway services under Eighth, Seventh and Sixth avenues and Broadway, and to PATH. The two-track configuration would continue under 34th Street and turn north under Madison Avenue, with trains stopping in the mid-40s to facilitate a short walk to Grand Central Terminal and to the Lexington Avenue and Flushing subway lines. The commuter rail tunnel would continue north and then turn west under 50th Street (or possibly 49th or 51st), with the next station located with its east end at Sixth Avenue and Rockefeller Center and its west end near Broadway or Seventh Avenue, providing for easy transfers to the Sixth and Seventh avenue and Broadway subway lines. The line would continue west, turning south under either Ninth Avenue or Tenth Avenue or use the existing railroad cut between Tenth and Eleventh Avenues, serving the proposed development on the FWS. This last version is the alignment shown in Figure 1.

The loop concept would provide for about 25 peak hour trains under the Hudson with the trains alternately using the two sets of tracks on either side of the station platform, allowing time for disembarking and clearing of the platform before the next train opens its doors. This track configuration would require that peak-period trains travel in a counter-clockwise direction. Unfortunately, those destined for the fourth stop would be slowed by stopping first at the other three stations, but on their return trip would have no added stops. Thus each rider would have on average 1 1/2 stops per round trip. In the off-peak, one set of tracks could be operated clockwise, giving the line a circulation capability in Midtown in both directions of the loop.

Testing the Loop

Because RPA believed the loop holds great promise, and because NJT did not estimate either its potential ridership or travel benefits as part of the EIS, RPA – working with NJT – has estimated these impacts using the same transportation demand forecasting tools used by NJT for the ARC project.

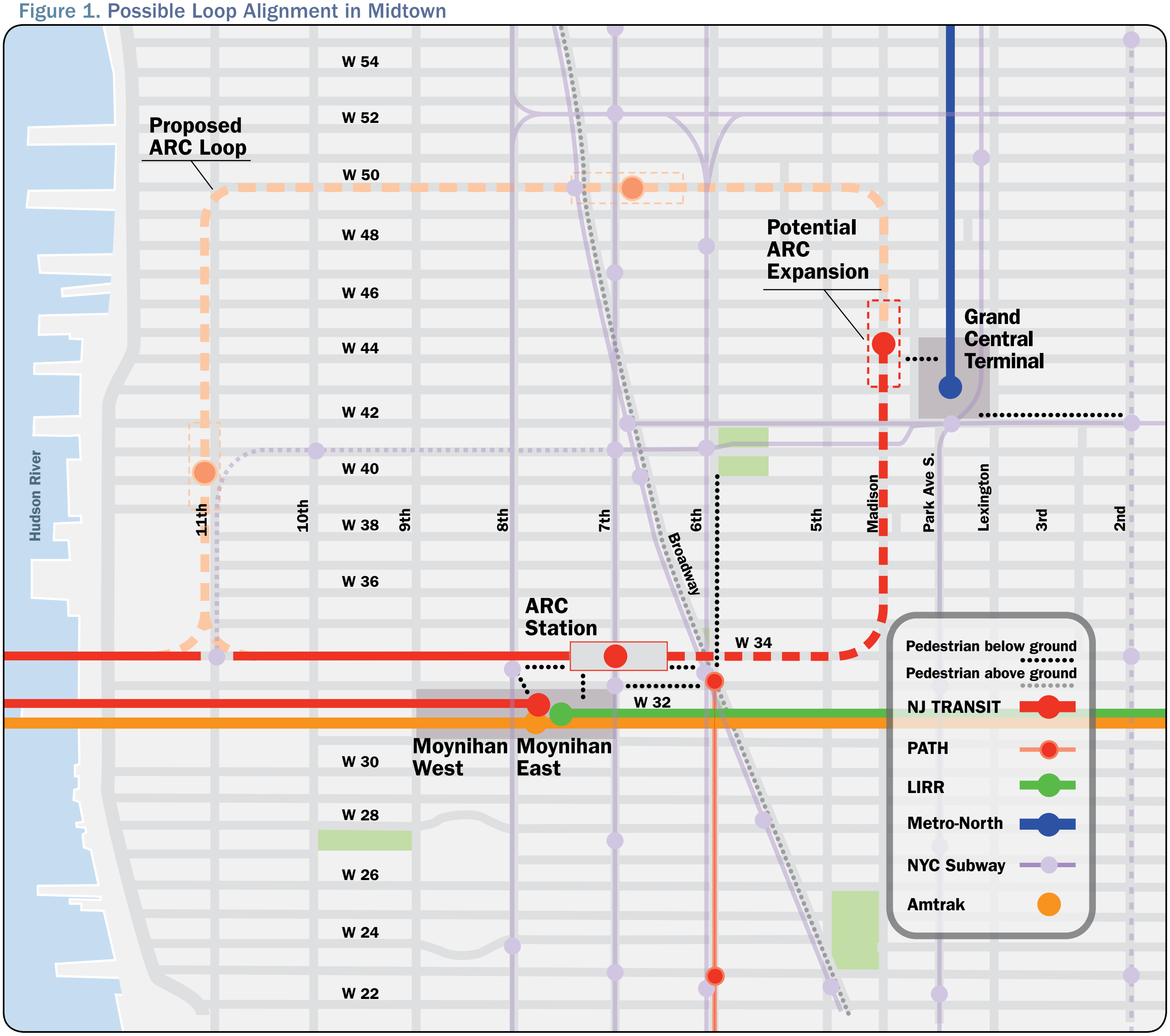
The transportation system connecting the two sides of the Hudson is very complex. Consequently, the choices that each traveler makes as to how to use this system are also complex – whether to travel, where to travel to, when to travel, what mode to use and within each mode what route to take? These are the critical questions that transportation modeling attempts to answer.

Transportation models quantitatively depict the available choices incorporating the observed sensitivities that travelers have to the features of the transportation system. As part of the EIS, NJT developed a set of sophisticated models that estimate ridership on the rail system under a variety of future conditions.

To test how travelers would respond to the RPA loop, NJT generously agreed to "run" the model for the 2030 forecast year used in the EIS, using the characteristics of the proposed loop. RPA provided NJT with assumed station locations, travel times on the loop, times required to reach stations and times for riders who might transfer to the subway system. These are summarized in Table 1.

NJT performed two model "runs," each based on the projected population and employment growth assumptions used by NJT for the EIS. The first run – the Base Scenario – assumes that the new tunnel would provide direct one-seat ride service into the new 34th Street station from four rail lines that now do not have direct rail service to Penn Station. Riders on the Main, Bergen County, and Pascack Valley lines, are now required to transfer in Secaucus to reach Midtown, and the Raritan Valley line riders, who now must transfer in Newark, would all use the new tunnel into 34th Street. The second "run" – the Loop Scenario – assumes that all the services into the 34th Street station would continue through the loop; riders from other lines

Figure 1. Possible Loop Alignment in Midtown



who wished to reach stations in the loop would transfer in New Jersey either in Newark or Secaucus.

The results of the loop model run are shown in Table 2. Of the 544,000 trips projected to travel eastbound in the morning peak period, about 32,000 would use the three added loop stations. This diversion would reverberate throughout the transportation network. About 19,500 of these travelers would no longer leave the NJT rail system at 34th Street or at Penn Station, but continue on to one of the three new stations. Another 6,000 would switch from buses and slightly fewer from autos to the rail service on the loop. The impacts on PATH or ferry use would be minimal, as would the impact on those travelers who now cross the Hudson to the north and use Metro North to Grand Central Terminal.

Not surprisingly, the majority of the users of the loop would disembark at the Madison Avenue station, situated in the heart of the job concentration near Grand Central Terminal. The area near this station is also the most difficult to reach from the Penn Station area, requiring either two subway rides, a walk of about a mile, or an expensive taxi ride.

The relatively high use of the Madison Avenue section raises the question of whether the most cost-effective portion of the loop, the first leg to Madison Avenue, with by far the highest ridership, should be advanced on its own without the other two stations. This approach has yet another benefit. Without the loop configuration the time penalty incurred by stopping at added stations would no longer occur, making the Madison Avenue station even more attractive for those destined to the east side of Midtown.

To test this, NJT "ran" the model with shorter times to Madison Avenue and without the added stations at 50th Street or at Tenth Avenue. Table 3 shows the resulting ridership for that configuration and compares it to the base ARC scenario. The model runs were completed prior to the recent changes made to the ARC project, which are detailed in the just released Supplemental DEIS. Due to the modified alignment and increased depth of the 34th Street Station, both the loop stations and the single added station option would have slightly higher ridership levels than shown here.

Table 3 indicates the Madison Avenue extension would attract about 7.5 percent fewer net riders – 30,000 versus 32,400

Table 2. Mode Split Before and After Loop

7am to 10am Eastbound Weekday Trips

	Base	With RPA Loop	Difference
Total - Commuter Rail	122,100	134,900	12,800
Total - Three Loop Stations	0	32,400	32,400
Madison Avenue & 45th	0	23,800	23,800
50th & Seventh Avenue	0	7,700	7,700
Tenth Avenue & 38th	0	900	900
New 34th Street Station	59,900	46,100	-13,800
Penn Station - New York	60,500	54,800	-5,700
Grand Central Terminal	1,700	1,600	-100
Total - Bus	89,700	83,700	-6,000
Port Authority Bus Terminal	76,800	70,900	-5,900
Lincoln Tunnel - not PABT	3,100	3,000	-100
GWB Bus Station	4,000	4,000	0
Holland Tunnel	5,800	5,800	0
Total PATH	97,700	96,700	-1,000
Total Ferry	28,000	27,900	-100
Total Auto	206,400	200,800	-5,600
Auto Drivers	152,200	150,300	-1,900
Auto Passengers	54,100	50,500	-3,600
TOTAL	544,000	544,000	0

Table 3. Mode Split Before and After Extension

7am to 10am Eastbound Weekday Trips

	Base	With Mad. Ave. Extension	Difference
Total - Commuter Rail	122,100	135,000	12,900
Total - Three Loop Stations	0	30,000	30,000
Madison Avenue & 45th	0	30,000	30,000
50th & Seventh Avenue	0	0	0
Tenth Avenue & 38th	0	0	0
New 34th Street Station	59,900	48,900	-11,000
Penn Station - New York	60,500	54,300	-6,200
Grand Central Terminal	1,700	1,800	100
Total - Bus	89,700	84,400	-5,300
Port Authority Bus Terminal	76,800	71,600	-5,200
Lincoln Tunnel - not PABT	3,100	3,000	-100
GWB Bus Station	4,000	4,000	0
Holland Tunnel	5,800	5,800	0
Total PATH	97,700	96,600	-1,100
Total Ferry	28,000	27,900	-100
Total Auto	206,400	200,100	-6,300
Auto Drivers	152,200	151,000	-1,200
Auto Passengers	54,100	49,100	-5,000
TOTAL	544,000	544,000	0

for the entire loop – but it would certainly cost much less, with one station instead of three and an added tunnel distance about one-third as long. However, the extension scenario results in a greater overall modal shift to public transit (rail and bus) than the loop, leading to a reduction of an additional 700 auto commuters and an increase in bus ridership. The utilization of the 34th Street station will increase due to the loss of the two additional loop stations, but is still 11,000 commuters below the base scenario, providing substantial relief and future station capacity

Table 4 compares both the loop and extension scenarios. The Madison Avenue station will see a 26% increase in ridership in the extension scenario versus the loop, absorbing the bulk of the ridership that was destined for the two additional stations. Penn Station also benefits from the extension, resulting in a decrease of an additional 500 commuters beyond the 5,700 reduction modeled in the loop scenario. The reduction of 6,200 commuters from Penn Station will provide substantial relief for a station that currently experiences considerable congestion during peak commuting periods. Both the PATH and the bus facilities will be slightly affected by the loop or extension (as mentioned earlier). The PATH will lose approximately 1,000 additional riders, with the extension diverting another 100. Bus ridership will diminish by 6,000 in the loop and slightly less (5,300) with the extension. The overwhelming majority of this will occur in the Port Authority Bus Terminal (PABT), with no discernible impacts at the George Washington Bridge Bus Station or Holland Tunnel.

Measures of Cost-effectiveness

The travel benefits of the loop and extension are many. Most obvious is the time savings for those who choose to use it and the value of the avoidance of transfers. Fortunately, the NJT program for estimating ridership also estimates travel benefits, conforming to the methodology prescribed by the Federal Transit Administration (FTA) for applications for "new starts" funding. The travel benefits are used to estimate a cost-effectiveness index (CEI), which is a comparative measure used to assess all "new starts" applications nationally. This index is defined as the ratio of the annualized capital and operating costs divided by the annual hours of benefit the project generates. The FTA has set various thresholds for this measurement:

- ➜ If the cost is over $28 per hour the project is rejected.
- ➜ At a cost of $22 - $28 per hour, the project may be considered, but ways should be sought to lower its cost without decreasing its benefits.
- ➜ At a cost under $22 per hour, the project is much more likely to be recommended.

Given this, it is useful to see how these two concepts, the loop and the extension might stack up against these thresholds.

The NJT modeling runs calculated the daily travel benefit measured in hours. The loop would provide 23,800 hours of benefit; the extension, 21,900 hours, about 8 percent less. The slightly smaller benefit value of the extension comes from the loss of benefits resulting from dropping the two stations, but is partially offset by the travel time gains to the Madison Avenue station without the full loop. On an annual basis the benefits amount to 6,900,000 hours for the loop and 6,351,000 hours for the extension.

To be "cost-effective" at the $28 per hour level the RPA loop's annualized capital and operating cost would have to be below $28 x 6,900,000, or $193,000,000. The extension would be cost-effective at a cost of $177,800,000. At the $22 per hour level, the annualized costs for the second and more stringent threshold would be $151,600,000 for the loop and $133,400,000 for the extension. In other words, if the annualized cost of the loop can be kept under $151,600,000 and the extension can be kept to under $133,400,000, these projects can be "cost-effective" from the federal government's perspective, and federal funding might more likely be forthcoming. Since the extension's cost is likely to be about one-third of the full loop, it is much more likely to meet the federal thresholds.

Table 4. Mode Split Loop vs. Extension

7am to 10am Eastbound Weekday Trips

	With RPA Loop	With Mad. Ave. Extension	Difference
Total - Commuter Rail	134,900	135,000	100
Total - Three Loop Stations	32,400	30,000	-2,400
Madison Avenue & 45th	23,800	30,000	6,200
50th & Seventh Avenue	7,700	0	-7,700
Tenth Avenue & 38th	900	0	-900
New 34th Street Station	46,100	48,900	2,800
Penn Station - New York	54,800	54,300	-500
Grand Central Terminal	1,600	1,800	200
Total - Bus	83,700	84,400	700
Port Authority Bus Terminal	70,900	71,600	700
Lincoln Tunnel - not PABT	3,000	3,000	0
GWB Bus Station	4,000	4,000	0
Holland Tunnel	5,800	5,800	0
Total PATH	96,700	96,600	-100
Total Ferry	27,900	27,900	0
Total Auto	200,800	200,100	-700
Auto Drivers	150,300	151,000	700
tt Auto Passengers	50,500	49,100	-1,400
TOTAL	544,000	544,000	0

Additional Benefits

There are other benefits not included in this calculation such as the diversion of buses from the overcrowded exclusive bus lane, over and above what the ARC itself will provide. The 6,000 bus riders attracted to the rail loop or extension will relieve the exclusive bus lane leading to the Lincoln Tunnel. While it is not possible to say if the bus lane will be in need of relief in 2030, given the impact of the diversion from buses caused by the increased rail service through the new tunnel to 34th Street, or of an additional bus lane leading to the Lincoln Tunnel, it is nevertheless likely that any relief will be welcomed. The 6,000 bus ridership diversion is likely to result in a reduction of about 150 buses, of which close to half are likely to occur in the peak hour within the morning peak period.

Another potential benefit would be the diversion of passengers from Penn Station and the new 34th Street Station, relieving crowding there. As shown in Tables 2 and 3 the RPA loop or extension are estimated to divert substantial numbers of riders from both the existing station and the new 34th Street station. This would have a further benefit of lowering congestion at these two locations and decreasing the time commuters would take to negotiate these two facilities. However, simulating the impact of these diversions in any quantified manner is not possible with the resources available.

Finally, an additional travel benefit would come from the diversion of drivers and the reduction of traffic congestion. The model results shown in Table 2 indicate a diversion of auto drivers of only 1,900 trips, with 3,600 diverted from the auto passengers. The diversion of auto passengers would not result in a reduction in vehicle volumes. The split between auto passengers and drivers shown in Table 2 and 3 was derived from the reported results of the model, and is not direct model output. Higher diversions of auto drivers, and thus of vehicles may be possible. Nevertheless, the 1,900 diverted vehicles would be significant. If only 50% of those *peak period* vehicles were to be removed from the roadways during the *peak hour*, they would represent the equivalent of half a lane of road capacity. Without detailed network-based analysis beyond the extent of our resources here, as with the station diversions, it is not possible to estimate the impact this diversion would have on the travel time of those who continue to drive.

The Extension or the Loop?

It is recommended here that the extension be pursued rather than the loop. Most of the benefits sought for the loop, particularly access to the East Side, would be retained with the one-station extension to Madison Avenue. The marginal improvements to Midtown circulation would be lost, but as described in section B, these objectives can be met with complementary projects. As Table 2 shows, because nearly three-quarters of the diverted riders to the three loop stations would alight and board at the Madison Avenue station, it would almost certainly be more cost-effective to extend the rail line only as far as Madison Avenue, avoiding the additional cost of the much longer loop extension.

It is recommended here that the extension be pursued rather than the loop.

B

Midtown Access and Circulation

If the superior strategy is to forgo the loop in favor of the extension, then the value of the loop as a midtown circulator is lost. But that value as a circulator was never great; with limited station locations and deep stations, the use of the loop for reaching various parts of midtown Manhattan is not compelling. This still leaves open the question of what is the best way of creating an improved Midtown circulation system.

How might the Madison Avenue extension be part of a larger set of improvements that can both ease access to and circulation within Midtown, particularly in light of the expected growth on the FWS of Midtown? To see how it might fit in as part of a complementary set of improvements, various combinations of projects were posited and their value for both access and circulation in Midtown were assessed. This exercise assumed that the extension of the #7 Flushing subway line to 11th Avenue and 34th Street, largely funded with a surcharge on the value of development it generates, was in place. It was assumed that both stations on this line were constructed, although at present the station at 42nd Street and Tenth Avenue is not funded.

Many proposals have been put forth in recent (and not so recent) years to address access to the FWS, and overall circulation in Midtown. Most prominent among them are the following:

- ➔ A 42nd Street light rail (LRT) line from First Avenue to the Hudson River
- ➔ A light rail loop along 42nd Street to the Hudson River, back on 34th Street and up Broadway to Lincoln Square, an RPA proposal first suggested in the 1996 RPA Third Plan, *A Region at Risk*.
- ➔ A transit link from Penn Station to the FWS (mode undetermined)

These proposals were assessed along with the full RPA loop and the Madison Avenue extension, individually and in combination, to see how they worked together to increase access to the FWS and within and to Midtown from other parts of Manhattan, from each borough, and from each sector of the region. Twenty† distinct areas in the Region were evaluated and given ratings of (a) substantial benefit if the improvement added direct service to the FWS; (b) some benefit short of direct service; and (c) no benefit at all.

The results of this analysis as applied to the individual project are shown in Table 5. This analysis is admittedly crude, and more formal evaluation to estimate such parameters as travel time savings, ridership, and cost should be pursued.

† These twenty districts include Midtown Manhattan, which was broken into eight sections, Upper East Side, Upper West Side, Harlem/northern Manhattan, Lower Manhattan, Brooklyn, Queens, Bronx, Westchester County, southwestern Connecticut, northern New Jersey, Hudson Valley, and Long Island.

Table 5. Project Ratings for Access to Far West Side for Projects Evaluated Individually

	Number of Areas With Improved Access		
	Substantial	Some	None
#7 Extension	4	12	4
Commuter rail loop	0	10	10
Madison Avenue extension	0	0	20
42nd Street LRT	5	12	3
Midtown LRT Loop	7	13	0
Penn Station Link to FWS	2	9	9

Table 6. Project Ratings of Each Project Combined with #7 Extension

	Number of Areas With Improved Acces		
	Substantial	Some	None
# 7 Extension Alone	4	12	4
Plus Commuter rail loop	4	15	1
Plus Madison Avenue extension	4	13	3
Plus 42nd Street LRT	4	12	4
Plus Midtown LRT Loop	8	12	0
Plus Penn Station Link to FWS	5	14	1
Plus Midtown Loop and Penn Station Link	9	11	0

Not surprisingly, the extension to Madison Avenue does little for access to the FWS – it doesn't go there. The full loop does have some benefits, but the infrequent service, especially with only one-directional service in the peak, and deep stations, do not provide efficient circulator service in the core. The #7 extension performs better, but its substantial benefits are limited to the locations that it connects directly to the FWS. The 42nd Street LRT and especially the LRT loop do a much better job in this regard, since their service is more geographically spread within Midtown, while the more targeted Penn Station Link naturally only fared well for linking the Penn Station area to the FWS.

The advantages of these two light rail projects over the #7 extension as a circulator, notwithstanding the #7 extension's ability to deliver high capacity transit to the FWS and its connectivity to the subway network, cannot be discounted. However, the cost and funding for the full project is still being negotiated, with no commitment at present to build the second station at 41st Street and Tenth Avenue. But if the station at 42nd and Tenth Avenue remains unbuilt, #7 extension's modest access benefits as a circulator would be further eroded. Another option is to build the light rail loop without the 42nd Street portion between Eighth Avenue and the Hudson River since the #7 extension will cover that area.

Given the #7 extension's likelihood, the next step is to see how each of these projects added to FWS access when combined with the #7. The results appear in Table 6 with the top row showing the scores of the #7 extension alone for comparison.

Table 6 shows that the additions of the commuter rail loop, the Madison Avenue station, the 42nd Street LRT, or the Penn Station link each do little to improve access to the FWS. (Compare them to the first line of the table). However, the Midtown LRT complements the #7 extension nicely, giving universally improved access to the FWS throughout the Region, even without the section from Eighth Avenue / 42nd Street and the Hudson River. The Penn Station link, when added to these two projects, slightly increases access to the FWS .

But what about the value of these projects for circulation within Midtown other than to the FWS? Here again the Midtown LRT fares well. It creates links among many points in Midtown, while the other projects work to improve Midtown circulation in a more limited way. Appendix I gives additional details on RPA's LRT loop proposal, through a transcription of the testimony presented to the New York City Council on the LRT concept in 1994.

This rudimentary evaluation of an array of projects to serve Midtown raises a number of issues. If the #7 extension station at 42nd and Tenth Avenue is not constructed, the value of the #7 extension is diminished considerably. With or without that station, there is considerable value in a connection between Penn Station and the FWS. The investigation of alternatives should be done hand-in-hand with the design of the proposed Moynihan Station / new Madison Square Garden Complex. A light rail line in Midtown would be of great value to both FWS access and Midtown circulation more generally; the value would be greatest if it took the form of a loop. These possibilities all deserve serious evaluation, as the City and the MTA look to strengthen the flexibility and capacity of the transportation system.

The Midtown LRT complements the #7 extension nicely, giving universally improved access to the FWS throughout the Region

C

How to Best Use the New Tunnel's Capacity

The Access to the Region's Core (ARC) rail tunnel under the Hudson River will double commuter rail capacity between New Jersey and New York. Today, direct rail service is confined to the Northeast Corridor, the North Jersey Coast Line from Long Branch north, the Morristown Line (Midtown Direct) and the Montclair Branch. With a new tunnel it will be possible to do some combination of the following:

- ➜ Add more direct services on lines that already have direct service, including the Northeast Corridor, North Jersey Coast line from Long Branch north, the Midtown Direct services on the Morristown and Boonton-Montclair lines (shown in red in Figure 2, next page);
- ➜ Create new direct service on lines that currently require connections, including the Bergen County, Main Line, Pascack Valley Line and the Raritan Valley Line (shown in orange in Figure 2); and
- ➜ Add services on lines not now in service, possibly including some of the following: the Northern Branch (Bergen County), Bergen-Passaic, Lackawanna Cutoff (Morris, Warren counties), Monmouth/Ocean/Middlesex line, the West Shore Line (Bergen County) and the West Trenton Line (Somerset and Mercer counties) (shown in dashed orange in Figure 2).

Each of these generic categories of new service brings with it benefits for the transit rider. New direct services on existing lines adds greater convenience by providing more time of travel choices and shorter waits for trains; new direct services save time on transfers; and entirely new services offer those without nearby rail service today an alternative to buses, which might save time and transferring, or long drives to existing rail lines.

Table 7. Criteria for Evaluating Use of Tunnel Capacity

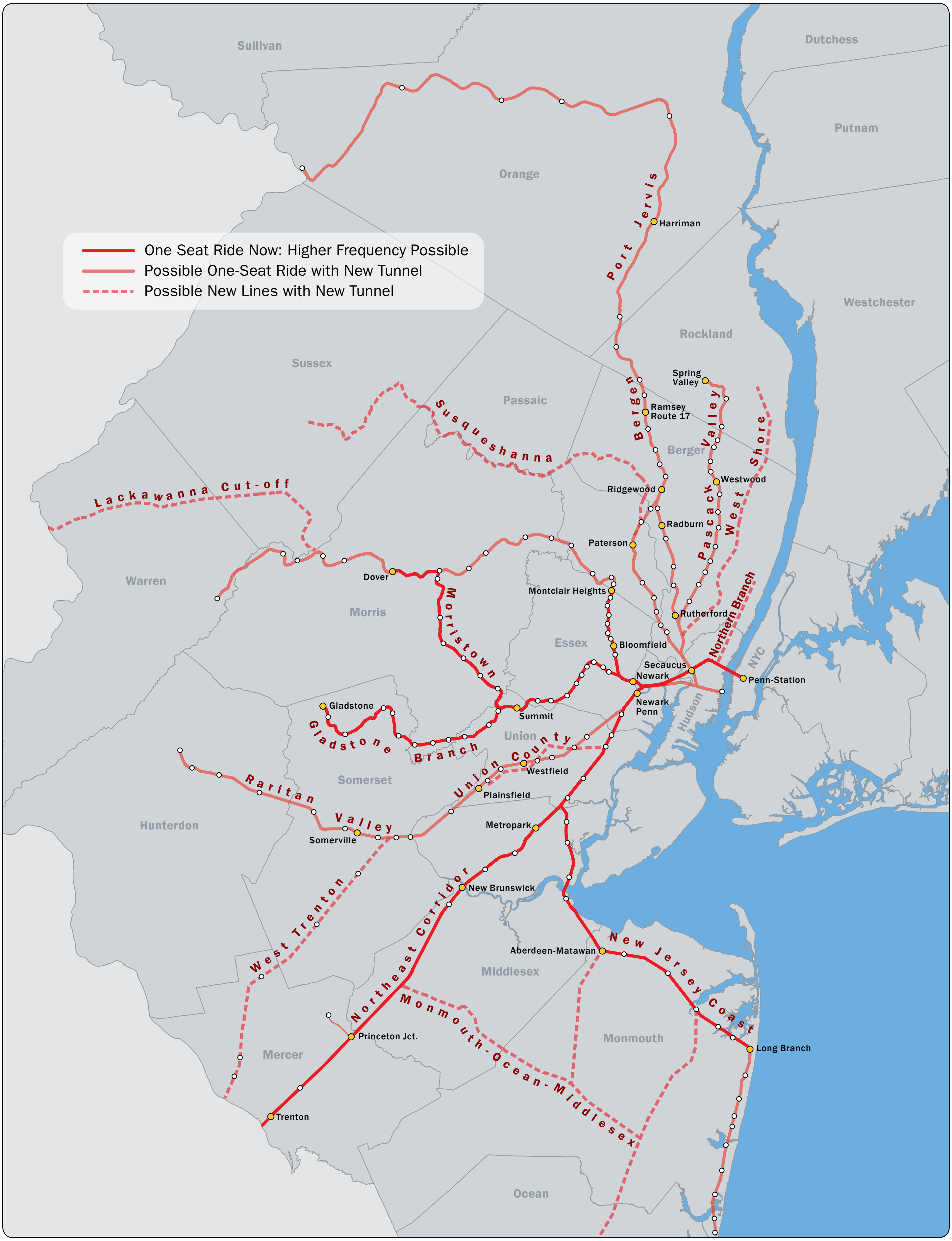
Criteria	More Service on Existing Lines	Direct Service	New Line
Ridership growth potential	Some	Some	Some
Travel time reduction	Some	Some	Some
Transfer reduction	No	Yes	No
Waiting time reduction	Yes	No	NA
Increased capacity on overcrowded lines	Yes	No	No
Diversion of auto traffic	Some	Some	Some
Providing rail service where none exists	No	No	Yes
Strengthening of land uses near stations	Yes	Yes	Possibly
Limiting auto-oriented sprawl	Yes	Yes	No
Relative cost	Low	Medium	High

How can we best evaluate which of these services have the greatest overall benefit?

In Table 7 the potential benefits are arrayed for the three generic categories. Unfortunately, Table 7 does not yield any easy answers. The relative value of these categories requires more detailed analysis than present resources allow. NJT modeling would be of great value in determining ridership and travel benefits for various combinations of tunnel use. What can be discerned from Table 7 is that in the absence of more quantified analysis it appears that either more service on existing lines or more direct service have a greater number arguments in their favor, particularly if reduction in sprawl is a prime objective. With that being said, it is possible that some of the new line proposals would not automatically lead to sprawl, especially those intended to serve more developed areas.

Since the decisions that are made on how to use the new tunnel capacity will go a long way in shaping New Jersey's land use and transit future, NJT should model these scenarios and release them to the public.

Figure 2. Possible One-Seat Services and New Lines with Tunnel



Appendix I

Testimony of Regional Plan Association in Support of the 42nd Street Trolley Proposal before the New York City Council April 19, 1994.

My name is Jeffrey Zupan. I am the Senior Fellow for Transportation at Regional Plan Association. RPA is a planning and research organization that has a long history of putting forth forward-looking and rational plans for the three-state metropolitan area, beginning with the region's first plan ever in the 1920s. In more recent times we produced two seminal works, *Urban Design Manhattan and Urban Space for Pedestrians*, each advancing pedestrian-transit related proposals that became reality in midtown Manhattan. In other words, we know the territory.

The proposed light rail trolley line across 42nd Street is a great idea and should be advanced. Regional Plan Association supports it.

RPA sees this proposal as only the first step of a much larger vision of what this trolley system can be -- a recognizable, permanent, positive presence and a unifying force for midtown Manhattan. We see the trolley route expanded to connect virtually all major Midtown attractions with every, yes, every transit service that brings people into the area. The RPA proposed trolley loop would extend the current 42nd Street line past the Javits Center and back past Penn Station to Herald Square. There, it would turn northward up Broadway through the theater district to Columbus Circle, or possibly Lincoln Center. Broadway would be closed to through-traffic, unlocking one of the most gridlocked intersections in Manhattan, Herald Square, and doing the same for Times Square.

This light rail loop would be available with an all-you-can-ride ticket, serving everyone -- tourists, residents, workers. Anyone entering Midtown by any form of public transit -- by commuter rail at our two rail terminals -- Grand Central or Penn Station, by commuter bus at the Port Authority Bus Terminal, by PATH at 33rd Street, by intercity rail (Amtrak at Penn Station), by every one of the 16 subway lines serving Midtown, and even by ferry at the Hudson River (and eventually the East River)-- would be just steps from the line. When airport access to our three airports is provided via the two rail terminals, even air passengers will be served.

Once in Manhattan, the line will be everyone's link to an unprecedented set of attractions (see partial list on the next page). They would just hop on and off to visit these locations. The line would become an economic boost for tourism -- one of the largest sectors of our economy, but one threatened by high costs and low amenity. When you saw the trolley you would know you were in center of the world's greatest city and within easy reach of all of its unique attractions.

It is time for New York City to show that we are prepared to build and rebuild our city, to have a vision of what we want it to be. There will always be reasons not to do something -- inertia is easy. Building is hard. But we dare not give ourselves less than what we deserve. Begin by advancing the 42nd Street trolley.

Attractions Accessible with the Light Rail Loop

United Nations
Ford Foundation Building
Chrysler Building
42nd Street Library
Bryant Park
New 42nd St. Entertainment District
Tour Boats around Manhattan
West 42nd St. Off-Broadway District
Intrepid Aircraft Carrier
Javits Convention Center
Madison Square Garden
Macy's
Empire State Building
Times Square Theater District
Duffy Square Tkts
Central Park
Lincoln Center
Most Major Midtown Hotels

Regional Plan Association
4 Irving Place, Room 711-S
New York, NY 10003
T: (212) 253-2727
www.rpa.org