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TRANSPORTATION IN NEW YORK, NORTHERN NEW JERSEY  
WESTERN CONNECTICUT METROPOLITAN AREA  
AT THE TURN OF THE CENTURY  
AND MILLENIUM

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I. INTRODUCTION

The New York/New Jersey/Connecticut metropolitan area has the most extensive rail and bus mass transit system in the country. It also has a huge array of major highways, roads, bridges and tunnels. While the region has poured billions of dollars into upgrading these mass transit and highway facilities over the last ten years, after years of undermaintenance, it faces a huge challenge to continue rehabilitating this system. The far bigger challenge is to design and put in place a transportation system for this region appropriate for its status as a world-class urban metropolitan as we enter the 21st century.

The subway and commuter rail system in the metropolitan region was largely in place early in this century. Even the most recent major addition - the Sixth Avenue subway, replacing and expanding the capacity of the El - was opened in 1940, a half century ago. The rail system's shape and alignment reflects the then existing development patterns in the region and the lack of dependence on the car as a primary mode of private transport. That development pattern was based on the concentration of most households and businesses in New York City and Newark, with a number of other centralized urban nodes in Connecticut, the Hudson Valley and New Jersey. In addition, the regional rail system was also designed to provide interstate travel, commutation between new suburban areas and the central urban cores and service to recreational areas, such as the north and south shores of Long Island and the New Jersey shore.

Over the last forty years, development patterns have changed enormously with the suburban development initially of the counties nearest to New York City and other old urban centers and, then, increasingly movement of households, shopping areas, office complexes and other businesses to further flung counties of the metropolitan region. Typically, in these developing parts of the region, zoning densities are low so that large tracts of land are consumed to house families and businesses.

As the distribution of households, institutions and jobs have become more spread out throughout the region, more and more people have found the in-place mass transit system less convenient or relevant to their needs. The result has been steadily increasing automobile dependency, escalating traffic congestion and vehicular miles traveled (VMTs) in response to evolving development patterns and decreased mobility for both people and goods. Mounting congestion is simply endemic to this development pattern. With this has come urban smog, despite cleaner cars, and increased consumption of fuel, despite more efficient vehicles.

With the economic recession in the region, there are several reasons why the time is ripe to consider dramatic changes in the transportation system in the region as we look towards the next century. Everyone complains about the traffic congestion, and that congestion imposes enormous costs on the region. It is generally recognized that this congestion will not be resolved through expansion of highway, bridge and tunnel capacity in the region, although some such projects are still in the works.

Furthermore, there is increasing resistance from environmental and community organizations to sprawling, low-density development in outlying parts of the region, now in forests or agricultural use. The Long Island Pine Barrens Society and other environmental organizations in Suffolk County are battling development in the remaining Pine Barrens of Long Island. The Appellate Division has recently upheld their position that the eastern towns of Suffolk County must prepare a regional, cumulative impact analysis before any development may proceed. Other groups are battling any development in Sterling Forest and seek its acquisition. Civic groups and local governments are working on a proposal to save much of the New Jersey Highlands. Several organizations, including EDF, have been seeking to save wetlands in the Hackensack Meadowlands and to alter development proposals there. Citizen groups in Rockland, Orange and Dutchess counties do not want to see patterns of already developed suburban areas replicated.

The new Clean Air Act Amendments of 1990 (CAAA) and the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) also inject both new funding and new thinking. The CAAA requires the region to come into compliance with air quality standards, in particular ozone, a regional pollutant formed by VOCs and nitrogen oxides. Since vehicles are primary sources of these ozone precursor pollutants, compliance with the CAAA and avoidance of its penalty provisions will require significant actions to reduce congestion and VMTs, even if, *arguendo*, all states in the northeast adopt the California tailpipe emissions standards. The ISTEA provides additional funding for both highway infrastructure and mass transit with state and local governments and their metropolitan planning organizations granted increased flexibility as to how to spend these funds.

To address congestion, traffic-related air pollution and energy conservation concerns, the occupancy rates of vehicles must increase substantially, many

people now traveling by car or goods traveling by truck must shift to rail or some other form of mass transit, and/or many people must live closer to where they work and shop. In fact, all three need to happen. This is an enormous challenge for the region, but also a great opportunity to reshape the transportation system and development paradigms to make them relevant to the 21st century.

## II. THE MASS TRANSIT SYSTEM

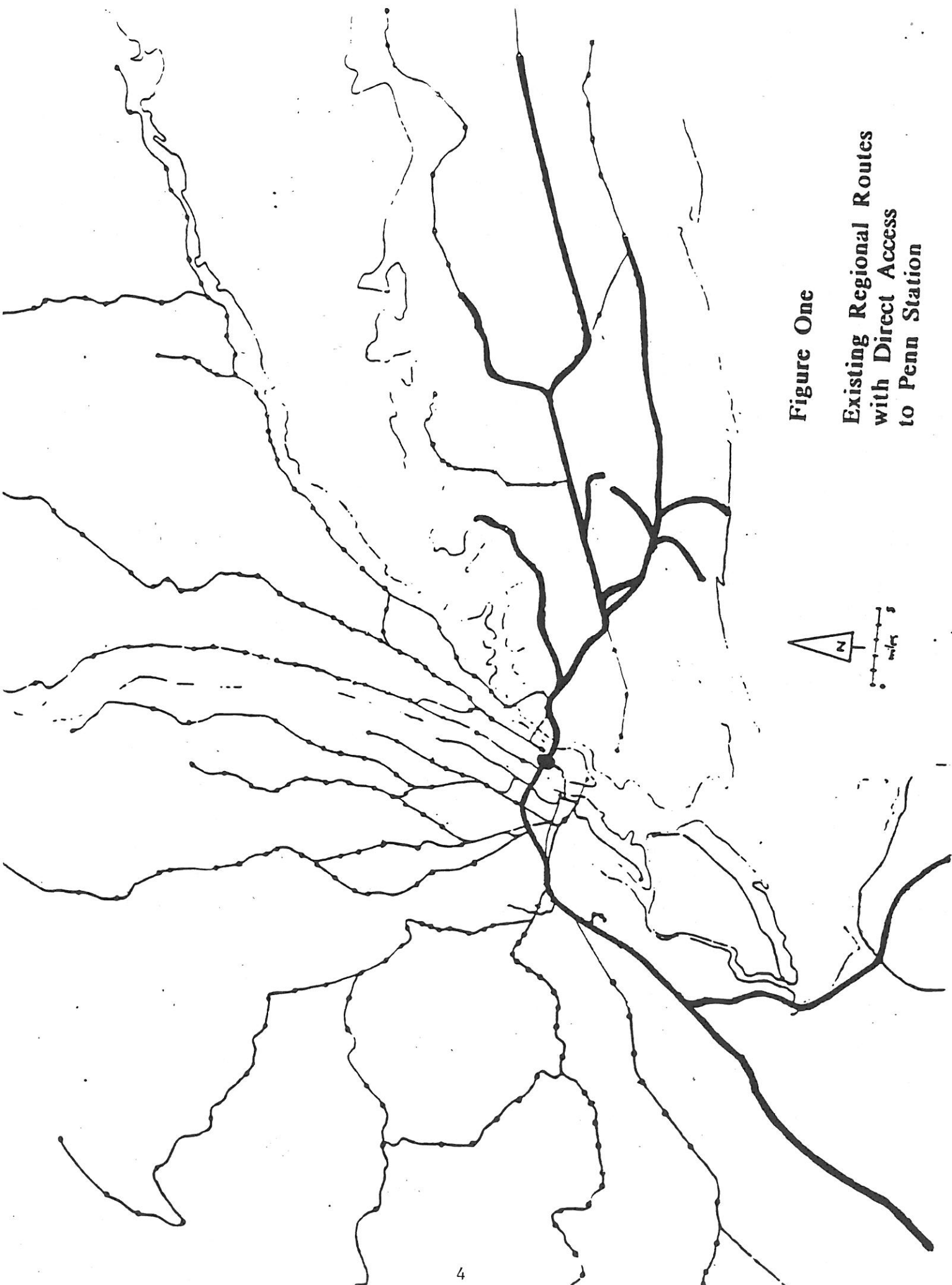
Fortunately for the region, the MTA, the Port Authority and New Jersey Transit have made extensive, multi-billion dollar investments in repairing and renovating the subway, surface rail and bus system in the region over the last 10-15 years. Continued renovation of the existing system and proper, on-going maintenance are central to the MTA's third five-year capital program. The existing surface rail system, largely a radial, somewhat disconnected network, is depicted in Figure One.

In addition, these agencies are considering some large investments that expand and extend capacity, provide transfer capability and improve speed and convenience. In general, these are exciting improvements. They include proposals for rail access to the three airports, the Kearny Connection, the Secaucus Transfer, light rail along the west side of the Hudson River, expansion of PATH capacity from Newark to the World Trade Center, expansion of Penn Station capacity, extension westward of the Flushing Number 7 subway line, possibly into New Jersey, the second avenue subway in Manhattan and the Oak Point connector in the Bronx.

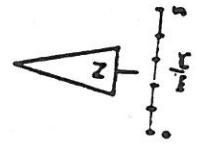
These projects begin the task of facilitating improved mass transit mobility throughout the metropolitan region. However, planning for mass transit should look afresh at the development patterns that have emerged in the region over the last half century, consider how the existing, largely radial network could be expanded to accomodate additional nodes and travel patterns that are not well served by the existing fixed rail system and then identify actions that all levels of government can take to mold future residential and business development to take advantage of an expanded rail system. It is likewise important to consider how expansions to the rail system can serve concurrently passenger and freight movement goals.

The overwhelming impression of the existing subsurface and surface rail system is that it is largely a radial network that serves well people living near and commuting to and from the central business districts of New York City and Newark. It does not serve well people moving in more diverse patterns throughout the region, either near its core or further out in the metropolitan region. Mass transit rail systems in other large world cities, such as London and Paris, provide much better mobility for loop or circumferential travel.

As a first step to accomodating these more diverse travel patterns on the regon's transit network, we propose to wake-up the sleeping giant of regional mobility - the commuter rail system. Much more frequent service would be



**Figure One**  
**Existing Regional Routes**  
**with Direct Access**  
**to Penn Station**



provided, and new service patterns would be added so that travelers could use the rail system for non-Manhattan travel. Furthermore, planning for use of more diversified transport, including use of vans and small buses that can easily service arriving trains or subways, should go hand in hand with planning for rail improvements. Integrated regionwide fares based on unlimited ride passes would allow travelers to combine bus, subway and rail links into a "seamless" transit network.

Critical to stitching the transit system together is to make optimum use of a key regional asset -- Penn Station. Originally built to handle profitable long distance sleeping car passengers, before the aviation age, the terminal has yet to be used to capacity as a commuter and Northeast Corridor facility. Figure One shows existing commuter rail routes that have direct service to Penn Station. We propose to convert Penn Station to a true Metro-Hub, as shown in Figure Two.

New connections in New Jersey would bring direct services from Central and Northern New Jersey and points in Orange and Rockland County, and Metro-North would add new Hudson line and New Haven line services on existing Amtrak trackage on the West Side of Manhattan and over the Hell Gate Bridge. Travelers from Westchester, Putnam and Dutchess Counties and from points in Connecticut could reach Penn Station, where they could connect with other regional lines. Through service from Connecticut and Long Island to New Jersey would be provided to maximize Penn Station capacity. The region's three major airports would also connect to Penn Station, either with direct service if short links were built to LaGuardia and Kennedy, or by extending the airport people-movers to nearby railheads, as is planned at Newark Airport.

While many diverse travel movements, particularly long haul commuters that must cross Manhattan, would find an upgraded, and interconnected radial transit system an attractive alternative to the auto, much of the circumferential auto travel would need further inducement to switch to transit.

We are in the process of analyzing circumferential rail extensions that would provide much greater flexibility in terms of movement throughout the region. Additions to the system that would allow loop travel through Brooklyn and Queens, north and south movement on Long Island, circumferential travel through Westchester County and New Jersey counties could accommodate a great deal of passenger movement that now depends on the car. Figure Three depicts three general alignments for loop or circumferential mass transit travel. Appendix A describes these proposals to expand the regional mass transit network in greater detail.

Because acquisition of new rights of way is often prohibitively expensive or out of the question, we have made maximum use of existing rail alignments, many of which are underutilized, abandoned or used solely for freight, and some selected highway links. Table One describes these new circumferential pieces and their major characteristics.

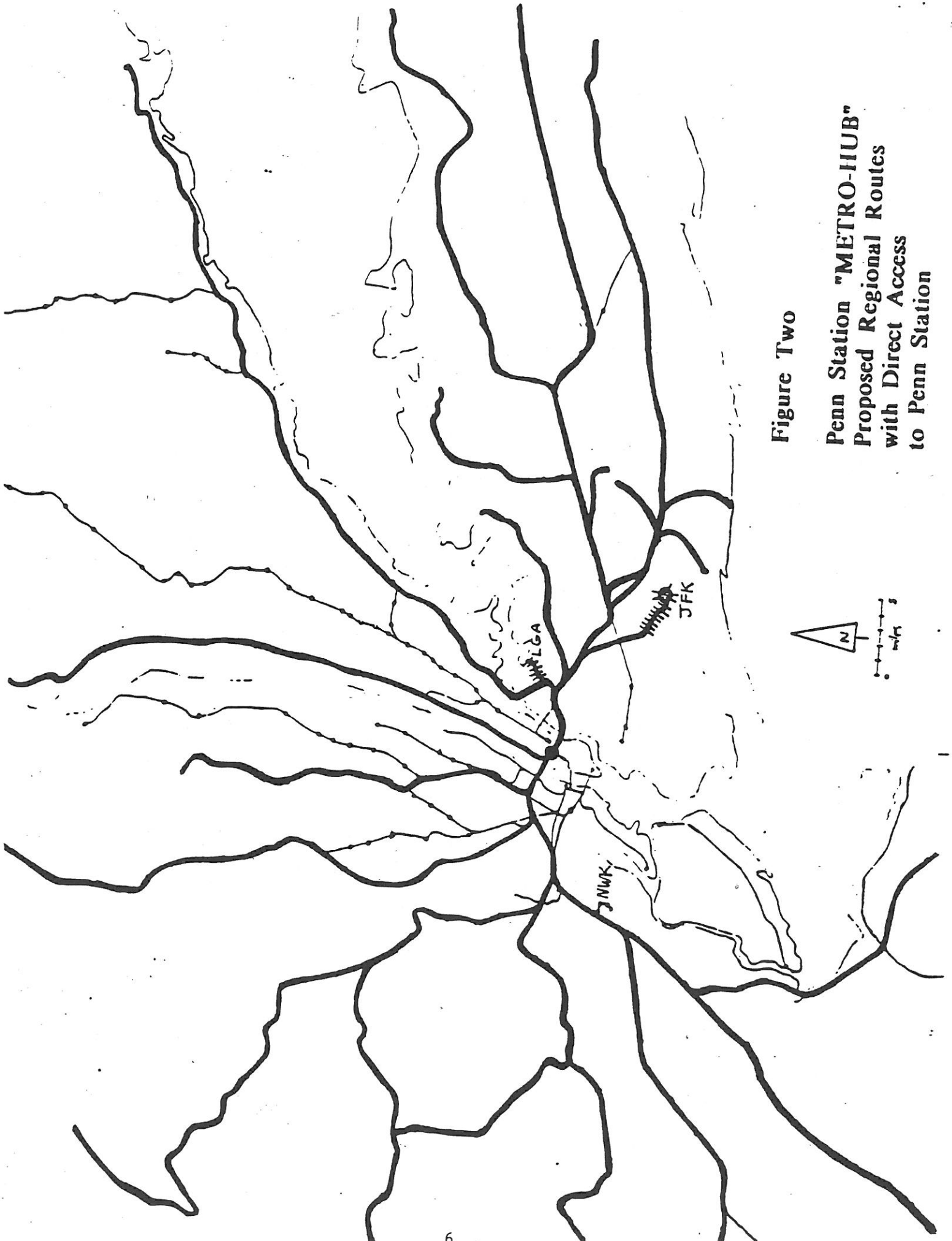


Figure Two

Penn Station "METRO-HUB"  
Proposed Regional Routes  
with Direct Access  
to Penn Station



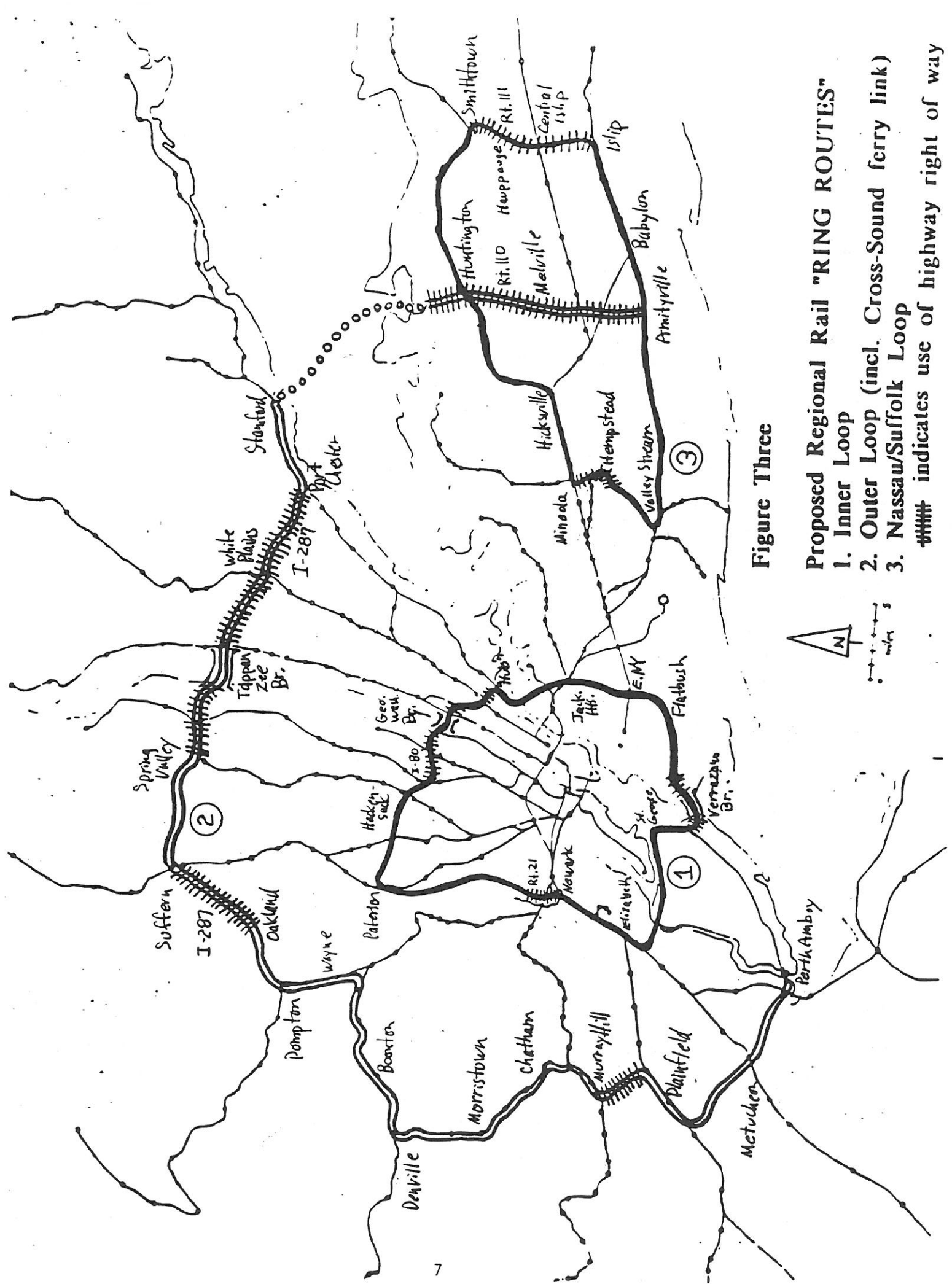


Figure Three

- Proposed Regional Rail "RING ROUTES"**
1. Inner Loop
  2. Outer Loop (incl. Cross-Sound ferry link)
  3. Nassau/Suffolk Loop
- ##### indicates use of highway right of way

That portion of the region east of the Hudson River has traditionally been at a disadvantage because of the absence of direct rail freight connections. For many years New York City's industries developed along its waterfront with much of the freight brought in on rail cars floated across the harbor from railheads in New Jersey. The operations were expensive to run and now only one car float link, the New York Cross Harbor line, remains, as shown in Figure Four. Most freight headed to New York City, Long Island and Connecticut now moves by truck. Trucks must use overcrowded highways, and this excessive truck dependence further worsens the air quality and livability of the crowded New York region. Furthermore, overloaded trucks contribute to the deterioration of pavements and bridges, without adequate compensation for this damage.

New York City and New York State are completing a program of increasing clearances for piggyback and oversized rail freight cars. This will provide many opportunities for shifting freight from truck to rail. However, further steps are needed. We propose that the Cross Harbor car float route, now in precarious financial condition, be expanded and integrated into the nation's rail freight network. Upgrading the car float to handle double-stack container trains should be considered, as part of a plan to make better use of the Brooklyn waterfront.

Because of the restricted clearances, and the limited daytime capacity through Penn Station, only a modest amount of freight, only mail and express, moves through this tunnel. Amtrak is now experimenting with a new type of rail technology - the bi-modal "roadrailer" vehicle. Highway trailers are outfitted with rail wheels, providing a low profile "piggyback" service that can negotiate the Penn Station tunnels. We propose that this technology be used in an ambitious way with new high speed intermodal services overlaid on key Amtrak routes, operating late night and off-hours, as shown on Figure Five. These lines converge at Penn Station, and the opportunity exists to locate an automated high rise container sorting facility over rail yards just west of the station. Manhattan-bound containers would be off-loaded at this point, with other movements by rail to points elsewhere in the City and Long Island.

These proposed expansions to the rail system could significantly improve mobility in the region and provide much needed alternatives to auto and truck use. We emphasize that this proposal is still at an early conceptual stage. But, even at this conceptual level, the proposal underscores the need for metropolitan-scale transportation planning and for a major overhaul of the MPO process, as ISTEA envisions, with much more public outreach and active participation upfront by non-government organizations. In addition, the SIP process must address how a major expansion of the mass transit system in the region could contribute to the level of reduction in loadings of VOCs and NO<sub>x</sub> from the transportation sector to achieve compliance with the ozone standard.

This region will continue to suffer from non-attainment, excessive dependence on oil used in its transportation system and congestion until and

Table One - New Regional Rail Ring Routes

Inner Loop

existing rail rights of way	60 miles
existing highway rights of way	13 miles
new tunnel	2 miles
total	<u>75 miles</u>

Outer Loop

existing rail rights of way	74 miles
existing highway rights of way	47 miles
Cross-Sound Ferry	13 miles
total	<u>134 miles</u>

Nassau/Suffolk Loop

existing rail rights of way	57 miles
existing highway rights of way	12 miles
total	<u>69 miles</u>



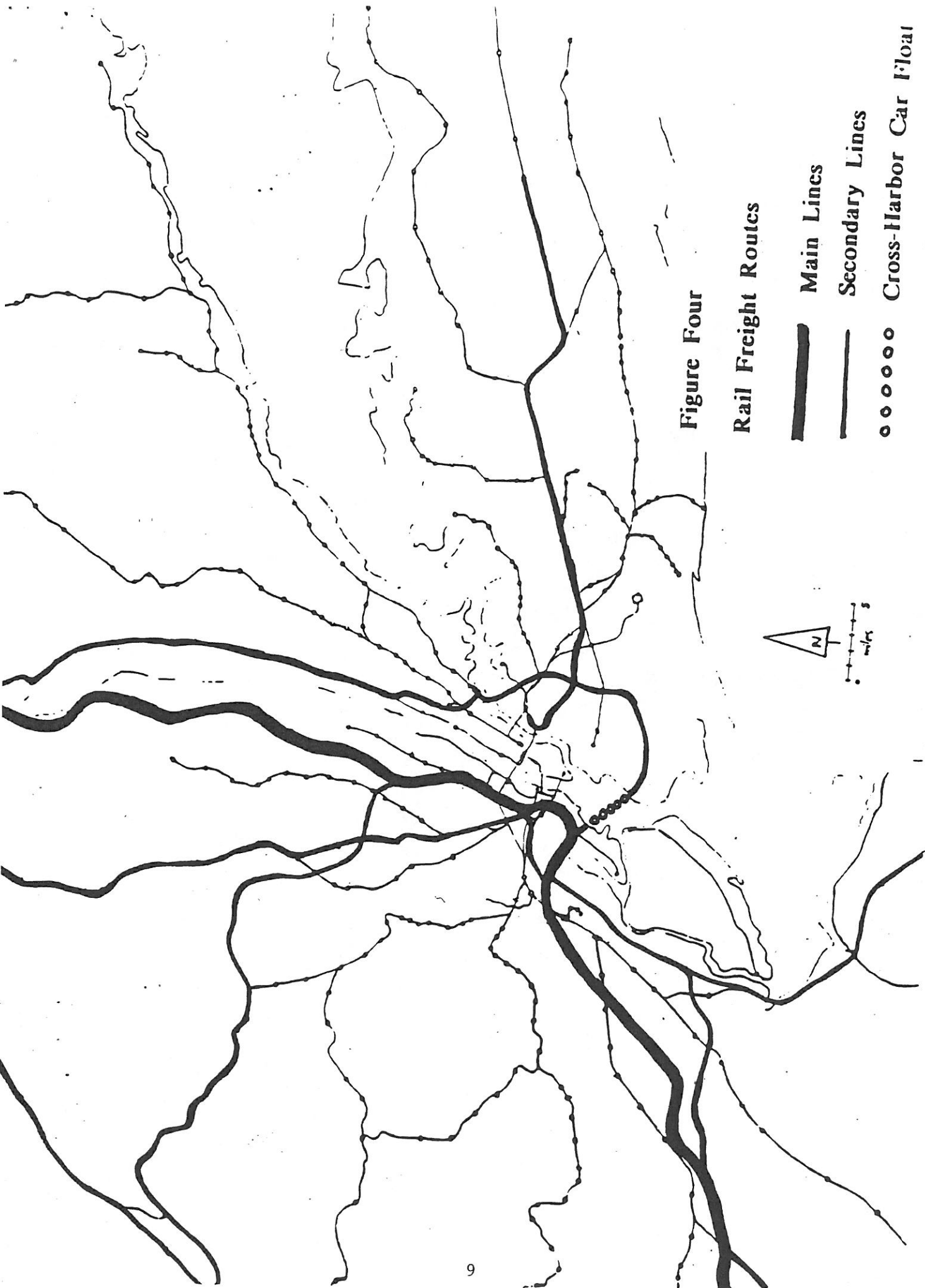


Figure Four

Rail Freight Routes

— Main Lines

— Secondary Lines

○ ○ ○ ○ ○ Cross-Harbor Car Float

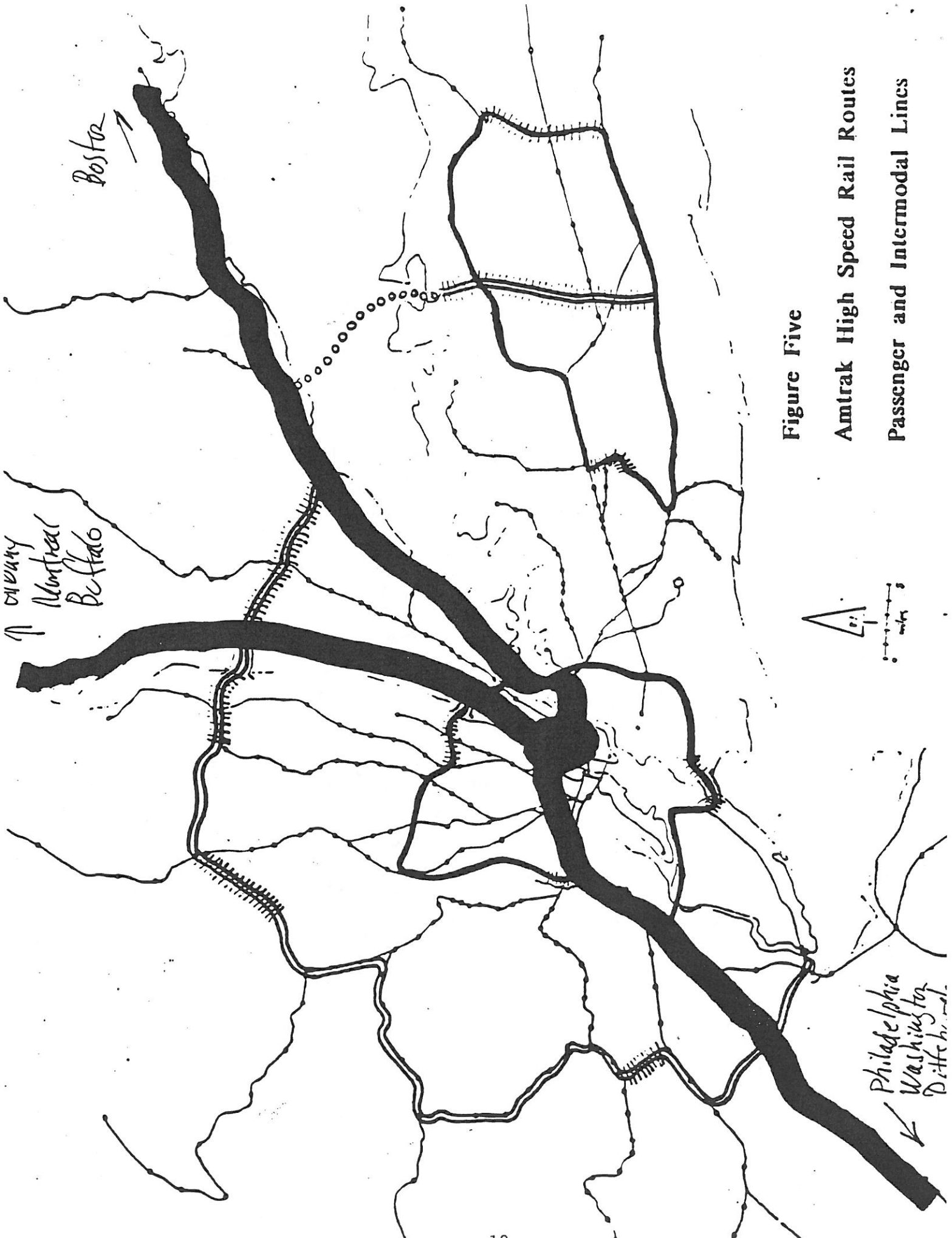


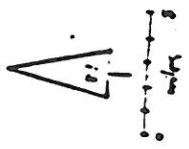
Figure Five

Amtrak High Speed Rail Routes  
 Passenger and Intermodal Lines

Philadelphia  
 Washington  
 D.C.

Montreal  
 Buffalo

Boston



unless New York and New Jersey and their urban centers and suburbs use the MPO process to make transportation planning and investment decisions in the best interest of the region.

### III. LAND USE

Patterns of development in the region over the last 40 years have not been conducive to efficient use of mass transit. Commuters living in Long Island, Westchester County, the Hudson Valley and many parts of New Jersey working in Manhattan, Brooklyn or Newark have been able to commute on mass transit. An increasing number of people have been reverse commuting. However, the sprawl character of location of homes and businesses has made it difficult to use the existing rail system, buses or vans.

The Regional Planning Association in "A Framework for Transit Planning in the New York Region", 1986, and other publications have described densities of development essential to efficient use of mass transit. The highway network built in the region over the last forty years has both contributed to decentralized sprawl and responded to it. Large investments in an expansion of the mass transit system described earlier should in time have considerable impact on the density of development in and around mass transit nodes. Clustered residential and business development around nodes would promote use of this expanded mass transit system.

To take maximum advantage, however, of the transportation efficiencies and environmental benefits of an expanded mass transit system, villages, towns, cities and counties should actively promote clustered development in proximity to these nodes. Some local governments today do not allow clustered, high density development around railroad stations. Others have taken active steps to relocate development away from such nodes. One such example was the decision of the town of Brookhaven to move its town hall and town offices away from downtown Patchogue within walking distance of the Patchogue railroad station to route 112 north of the Long Island Expressway accessible only by car. An EDF paper entitled "The Potential for Transit-Friendly Zoning" by Jeremy Pomeroy describes specific examples of zoning and other land use measures by local governments in the region as they relate to use of mass transit.

Transportation planning and investments should be linked very directly to local and county land use and infrastructure policies. Transportation agencies should commit to making major improvements conditioned on local government actions to spur clustered, higher density development in proximity to those nodes. For example, the Kearny Connection will improve service immensely along central New Jersey rail routes. One consequence could be a willingness of people and employers to move even further away from the railroad stations that will benefit because faster, more convenient rail service will compensate for the additional auto travel time. This could be counterproductive. On the other hand, benefitted local governments could use zoning and infrastructure investment decisions to channel development. These

major transportation investments should not be made until all affected local governments have taken the requisite land use actions.

Further, all zoning for and planning of large offices and other business complexes should take into account ease of access to mass transit nodes and measures to discourage use of single occupant vehicles. Parking spaces should be limited. Use of vans should be encouraged. Mass transit improvements of the sort that are being planned in northern New Jersey should be carried out in conjunction with such zoning changes and parking arrangements. This is not interference with local land use prerogatives. In fact, over the last 40 years, local governments have had only modest control over the patterns of development that have evolved within their boundaries. Larger economic and demographic forces have had a far larger impact than strictly local decisions.

#### IV. INTERNALIZING COSTS AND FINANCING OF THE TRANSPORTATION FUTURE

The costs of not only maintaining and renovating, but expanding, the mass transit system in the region, converting it into an early 21st century system relevant to the needs of the region, will be huge. In addition, even if the region builds no new highway capacity (and it should not), the costs of properly maintaining existing highways, bridges and tunnels will be huge. All of the money available to the region through ISTEPA and new state money, such as the business petroleum tax in New York, even if effectively spent, will not suffice. Yet, economic growth in the region depends on a modern, well-maintained transportation system with expanded mass transit and freight rail capacity.

The logical source of funding relates to the enormous social costs imposed on the region by the ever increasing use of automobiles and trucks. Those costs are reflected, first and foremost, in congestion and its consequences for air pollution, energy consumption, wear and tear on infrastructure and accidents. Brian Ketcham, Charles Komanoff and others have documented and are documenting these costs. The question then is how to capture these costs in a manner that reduces congestion, wasted time, air pollution and energy use dramatically, efficiently and fairly. This can be done if the revenues derived from capturing these costs are used to finance both proper maintenance of existing transportation facilities and expansion of the mass transit and freight rail network, with land use and economic development programs designed to foster development around key nodes.

For this kind of transportation planning and investment to work, the three states of New York, New Jersey and Connecticut must act cooperatively. Likewise, they must move jointly on financing mechanisms. Two primary techniques to capture auto and truck-related congestion costs are highway congestion pricing and escalating state transport fuel taxes. Others include smog fees, higher registration fees and parking fees. These and other pricing



strategies are evaluated in the southern California context in "Transportation Efficiency: Tackling Southern California's Air Pollution and Congestion", Environmental Defense Fund and Regional Institute of Southern California, Michael Cameron, March 1991.

Highway congestion pricing may now be considered in the region with the advent of new technologies. Traditional toll plazas are a nuisance and can contribute to congestion. The Port Authority and the MTA have just completed tests at the Verrazano Narrows and Goethals bridges of electronic toll collection systems. The desired technology is one that should allow vehicles to continue moving past pricing points. In addition, for this system to work efficiently, virtually all vehicles should have the requisite electronic device in place. This could be done at the time of registration, change of plates or purchase of new vehicles. With this technology in place, it should be possible to control congestion, not only at bridges and tunnels, but critical at highway segments, through pricing signals.

Based on the factors that Professor William Vickery has noted, these prices should reflect congestion conditions. They can therefore take into account time-of-day, time-of-week, geographic and other conditions. This kind of pricing should be pursued and implemented as the expanded mass transit system described earlier becomes available so that most drivers and truckers have alternatives. One approach for a highway pricing strategy would be to have three zones in the metropolitan area - outer, middle and inner (central business districts) reflecting use conditions. Prices could vary based on time-of-day considerations. Vans and buses could be charged far lower prices than private automobiles.

Mass transit alternatives will become more attractive alternatives, not only when new rail links are in place and the system is modernized, but pricing options appeal to consumers. A uniform magnetic fare card system used by all mass transit agencies operating interconnected systems provides the technological basis for such a mass transit pricing strategy. These agencies could make weekly and monthly, as well as daily or single trip, cards available. A three-zone pricing approach should also be considered. A person should be able to travel from eastern Long Island into New Jersey or up the Hudson Valley using a single magnetic card. A monthly pass for the entire region would enable the holder to travel on mass transit anywhere within the region any time.

The three states in the region should also adopt a common state vehicular fuel tax both to encourage purchase and use of increasingly efficient vehicles and to help fund the 21st century transportation system for the region. We propose an addition to the existing gas taxes of three cents per year for the next ten years. This forward-looking approach would give all consumers advance notice that gas prices are apt to increase over the next decade. In addition, revenues would begin to escalate as the region's plans for an expanded mass transit system as outlined in this paper are ready for implementation. At least half of these additional revenues state-wide should be used to finance maintenance and expansion of mass transit and the intercity

high speed rail system.

## V. INSTITUTIONS

The 1990 CAAA, ISTEA, energy dependency and common sense all demand significant changes in the way transportation planning are done and investments made in the region. The more rapidly the region can make this transition, the greater the likelihood that ISTEA and state funds now available will be well spent and that future planning will be innovative and relevant to the region's needs.

First, the MPOs must become important organizations in making present and future transportation planning and financing decisions, with the technical ability and political clout to do so. This means that the operating agencies, including New York State DOT, will have to yield some power to the MPOs.

Second, the state DOTs should operationally focus less on pouring concrete and more on providing mobility services. New Jersey DOT has a far better track record on this score than New York DOT, perhaps because it has responsibility for New Jersey Transit, as well as the state's highways.

Third, the state and local agencies responsible for preparing SIPs and otherwise implementing the programs of the CAAA must become much more active players in the transportation planning and fund allocation decision process. How ISTEA and comparable state funds will be allocated between mass transit and highway, highway maintenance and expanded capacity and metropolitan areas and more rural areas will determine to a large degree whether the region complies with air quality standards. These agencies now are largely observers to this process, with little technical expertise to play an expanded role that federal law now mandates.

Fourth, the region must have a strong institutional capability to make sound transportation planning and investment decisions for the region. This means that the relevant MPOs must develop techniques for cooperative action.

With all this, institutional change by itself is not enough without some shared sense as to what the agenda should be. The agenda cannot continue as business as usual. Under the aegis of the MPOs, the responsible agencies should put in place a process for thinking about this agenda in a bold and creative way, involving non-government groups upfront. Despite the changes that ISTEA is beginning to force on decision-making, this process remains remarkably closed to the public, in particular to environmental and civic groups, whose support is so essential for political support and good decisions. Even the MTA, relatively open compared to many other agencies, tends to invite in non-government transportation experts and advocates after it has made key planning decisions. With one or two exceptions, the region's transportation agencies have become more open to the public in the last few years.

The region faces tough and complex transportation and land use decisions. Environmental and civic groups should be deeply involved in scoping out these decisions upfront. Wrenching changes are possible only with broad-based support and understanding.

## Appendix A

### Brief description of each ring route:

#### Inner Loop

The inner loop is a 75 mile circumferential that uses existing rail freight and passenger lines for 80% of its route. Rail lines used would include the Bay Ridge Freight Line through Brooklyn and Queens and across the Hell Gate Bridge to The Bronx, portions of the Port Morris Branch and the Hudson Line in the Bronx, the Susquehanna Line from Hackensack to Paterson, the former Erie Railroad Newark Branch from Paterson to Newark, the Northeast Corridor Line from Newark to Elizabeth and the Staten Island Rapid Transit line from Elizabeth to Staten Island.

Highway rights of way would be used to fill the missing gaps. Key gaps are across the Verrazano Narrows Bridge and the George Washington Bridge, where two lanes on each bridge would be converted to rail operation. This conversion would substantially increase bridge passenger-carrying capacity. Other highway links used would include portions of I-80 in Bergen County, Route 21 in Newark, and short segments of the Staten Island and Gowanus Expressways on the approaches to the Verrazano Bridge. From Mott Haven to the George Washington Bridge three short tunnel links and a new bridge across the Harlem River would be needed for a high quality grade-separated route.

The inner ring route would intercept each radial subway or commuter rail line at a key transfer station. Most of these stations could be focal points for additional transit-based development.

#### Outer Loop

The 134 mile outer loop ties together 74 miles of existing rail line with a 13 mile Cross Sound passenger-only ferry and some 47 miles of highway right of way. Key rail segments include portions of the New Haven Line from Stamford to Port Chester, the Piermont Branch in Rockland County, a short segment of the Susquehanna Line in Passaic County and a combination of segments of the Greenwood Lake, Boonton, Morristown, and Gladstone Lines in Central New Jersey. The Raritan Valley and Lehigh Valley lines would complete the loop, ending at the Perth Amboy waterfront, where restoration of the Tottenville Ferry would link the loop to Staten Island. Highway alignments would include the Route 110 Corridor from Amityville to Huntington Harbor in Suffolk County, the I-287 Corridor from Port Chester to Nanuet in Westchester and Rockland Counties and from Suffern to Franklin Lakes in Bergen County, and several arterial streets in the Murray Hill-Fanwood area. Two lanes of the Tappan Zee Bridge would be converted to light rail or light rail with selected HOV operation.

The outer loop would connect with each commuter rail line at key locations and would help to focus economic development at these regional centers. Among these are Amityville, Republic, Huntington, Stamford, Port Chester, White Plains, Tarrytown, Nanuet, Spring Valley, Suffern, Wayne, Boonton, Denville, Morristown, Murray Hill, Plainfield, Metuchen and Perth Amboy. The loop would also pass near newer campus-type development along the Route 110 Corridor in Melville in Long Island and the Platinum Mile in Westchester. Stations in these areas would require company-provided shuttle vans, and eventually people-mover links, to reach existing developments at these locations. New development would be focused at the loop stations.

#### Nassau-Suffolk Loop

Two new cross-island links would connect the North Shore and South Shore radial commuter rail lines to form a 69 mile suburban Long Island Loop. The two new links would be (1) the Route 111 Mineola-West Hempstead line through Hauppauge and (2) a centers. The loop would link most of the major rail stations on the LIRR superimposing a new service on the Manhattan oriented carrier.

#### Suggested Rail Technology

The three loops each require considerable use of highway right of way to link rail trackage. If the links built along highways are fully grade separated then a standard rail vehicle is appropriate. To reduce cost and begin the service sooner a "hybrid" light rail/regional rail vehicle should be considered. These cars would be capable of street running, as an interim measure, while being fully compatible with freight railroad, commuter rail and rapid transit standards. The cars should be light enough to cross the Verrazano, George Washington and Tappan Zee Bridges. Developing rail lines along these highways will require considerable sensitivity to the needs of the local communities affected.

