NATIONAL STRATEGIC TRANSPORTATION PLANNING STUDY

SOUTHERN NEW JERSEY/ SOUTHEASTERN PENNSYLVANIA URBAN CASE STUDY

EXECUTIVE SUMMARY
MAY 1989

Delaware Valley Regional Planning Commission
The Bourse Building, 21 South Fifth Street, Philadelphia, PA 19101

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Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency which provides continuing, comprehensive and coordinated planning for the orderly growth and development of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties as well as the City of Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. The Commission is an advisory agency which divides its planning and service functions among the Office of the Executive Director, the Office of Public Affairs, and four line Divisions: Transportation Planning, Regional Information Services Center, Strategic Planning, and Finance and Administration. DVRPC's mission for the 1980s is to emphasize technical assistance and services and to conduct high priority studies for member state and local governments, while determining and meeting the needs of the private sector.

The DVRPC logo is adapted from the official seal of the Commission and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River flowing through it. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey. The logo combines these elements to depict the areas served by DVRPC.

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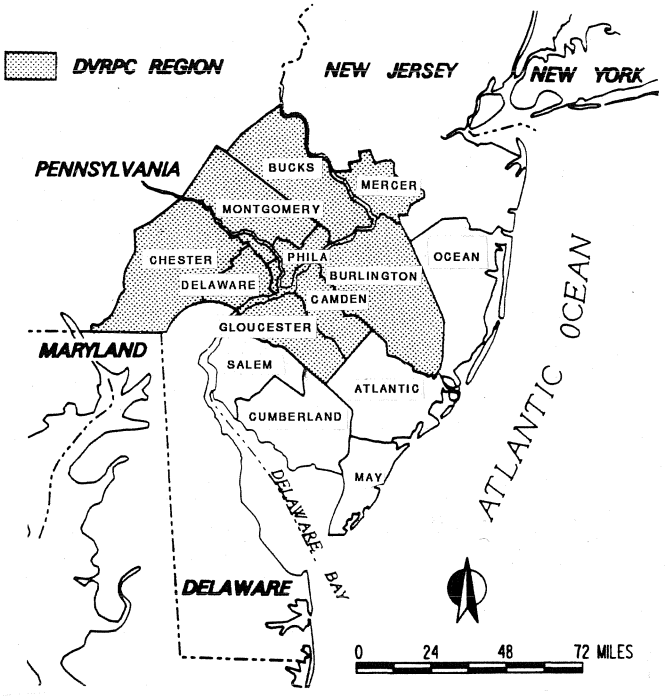
EXECUTIVE SUMMARY

This summary provides a synopsis of the urban case study of the Southern New Jersey/Southeastern Pennsylvania region undertaken as part of the National Strategic Transportation Planning Study. This region was selected as one of five regions in the United States to provide detailed analyses of urban transportation needs, delineate alternative scenarios, and estimate capital and operating costs for the Year 2015.

LOCATION MAP

The study area encompasses the nine member counties of the Delaware Valley Regional Planning Commission (DVRPC), including the Philadelphia Metropolitan Area (Burlington, Camden, and Gloucester counties in New Jersey; and Bucks, Chester, Delaware, Montgomery, and Philadelphia counties in Pennsylvania), and the Trenton area (Mercer County). The remainder of southern New Jersey (Atlantic, Cape May, Cumberland, Ocean, and Salem counties) is also included in the study.



Detailed analysis of transportation needs and costs is limited to the nine counties within the DVRPC region, while only general transportation issues are addressed in the remaining counties.

Throughout the course of the study, DVRPC's staff has maintained a liaison with the Study Steering Committee, as well as with DVRPC's Board and technical advisory committees. These groups have monitored progress, reviewed results, and offered comments which have been incorporated into the final report.

TRANSPORTATION PROBLEMS, GOALS, ISSUES, AND OPPORTUNITIES

In order to move people and goods more efficiently throughout the region by the Year 2015, the transportation system should provide:

- Adequate service for highway and transit users, which in turn relieves overcrowded highways, encourages the use of public transportation, and accommodates the needs of commerce;

- Adequate service to all population groups in the region consistent with the need to make efficient use of scarce resources and to balance costs and benefits;

- A safe and secure travel environment for motorists, transit riders, cyclists, and pedestrians;

- Positive impacts on air quality, land use, energy consumption, and the economic vitality of the region;

- Coordinated and consistent transportation services adaptable to changes in land use, future technology, and energy supply;

Issues and problems involving highways and transit facilities, development and travel patterns, transportation financial needs, and impacts on air quality and energy consumption were identified and analyzed.

The Highway System

Ensuring sufficient available capacity to meet the needs of commerce and to provide general mobility represents the central issue facing the region's highways. The experience of the eighties has been that the increase in demand for highways has exceeded the increase in supply, a tendency expected to continue through the Year 2015. While some new highways will be planned and built in the intervening period, emphasis will be placed on completion of projects already begun and on improvements aimed at increasing the capacity of the existing system in order to prevent a gridlock situation in the 21st century.

The most severe and intractable congestion problems currently occur in rapidly developing suburban areas, such as along US 202 from Wilmington (DE) to New Hope (PA), US 30 in Chester and Delaware counties (PA), US 1 near Princeton (NJ), and NJ 73 from Palmyra to Berlin. In such areas, an effort will be required to expand highway capacity in order to accommodate increasing travel demand. In addition, more effort will be required to maintain the highway system at acceptable standards and to reconstruct older facilities.

The Public Transportation System

The public transportation infrastructure in Pennsylvania is aging and requires extensive renewal in order to continue delivering adequate service to the region. Elements requiring renewal include track and structures, signaling and train control, stations, and maintenance depots. In addition, travel demand is changing and attention should be paid to restructuring service to better meet the needs of current and developing markets.

In New Jersey, effort needs to be directed toward increasing the effectiveness and market penetration of public transportation. New rail lines are needed to serve growing areas in Burlington and Gloucester counties. The cost of providing bus service could be reduced and ridership increased through a general rationalization of the system, in which good service is provided on a simplified route network. Lack of coordination between connecting carriers with respect to service and fares also constitutes a major barrier to attracting riders.

The use of modern fare collection equipment on a regionwide basis would permit design of a fare structure that better relates markets to the cost of providing service and the value of service to the user. Transportation Management Associations also show promise for providing innovative solutions to service problems in suburban growth areas.

Freight Transportation

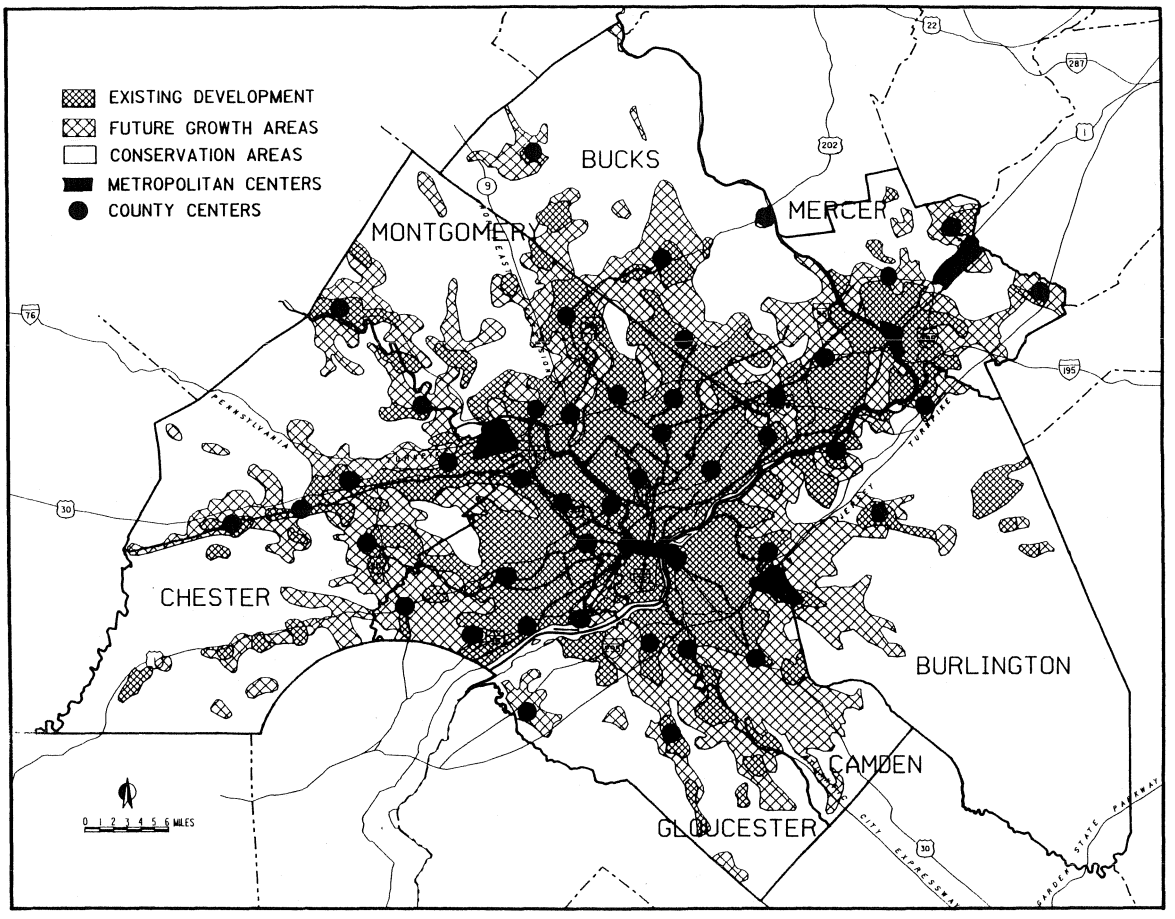
The region, in general, has adequate infrastructure for moving freight; geographically, it is an ideal location from which to play a major role in the distribution of goods to the mid-Atlantic states. However, in order to play a more important part in goods movement, the region needs to: improve highway connections to and from economically vital areas; remove clearance restrictions for trucks and double-stack trains; utilize new intermodal technologies; provide better access to the ports, and streamline port administration.

Two major concerns facing the trucking industry include completing key interstate connections and improving access to the central portions of older cities. Deregulation has left Conrail as the dominant rail carrier in the region. Rail traffic has also been shifted from finished products to bulk commodities. Both factors have greatly changed the nature of railroading in the Delaware Valley and throughout Southern New Jersey. To survive, the industry has been forced to reduce costs and streamline their operations, resulting in the abandonment or transfer of light-density and feeder lines to new shortline operators.

The Delaware River ports have recently experienced a substantial loss in their share of East Coast shipping traffic. This has generally been due to a lack of unified decision making, failure to modernize cargo handling facilities, and problems of highway and rail access. Approximately $700 million will be needed to improve port facilities in the region.

Land Use Development

The undirected suburban growth of the past two decades has greatly strained existing infrastructure. Concern exists among planners and public officials that no affordable level of public investment will provide sufficient capacity, unless development is constrained or channeled. Zoning is sometimes uncoordinated between adjacent municipalities, and contradicts regional and county land use plans, which attempt to guide the design and implementation of transportation improvements.

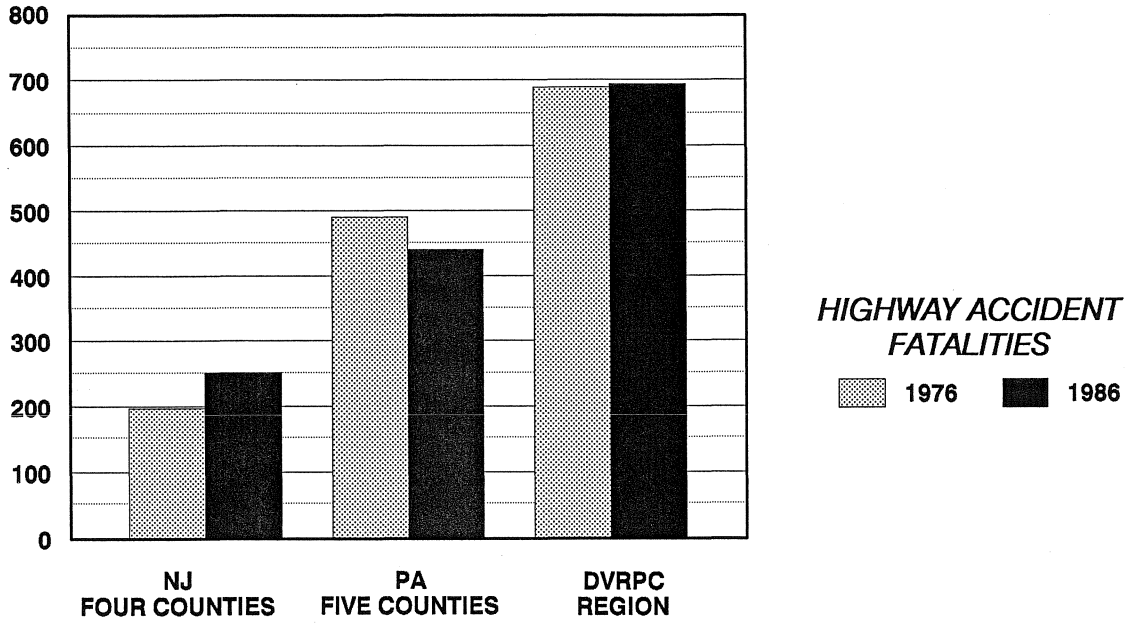


GENERALIZED YEAR 2010
REGIONAL DEVELOPMENT STRATEGY

DVRPC's adopted Year 2010 land use strategy recommends the preservation of open space, with approximately 60% of the region's land designated as conservation areas.

Transportation Safety and Security

In the past, highway safety programs have focused on the driver. However, within the last two decades more attention has been paid to improving highways and vehicles. New highways generally enjoy lower accident rates than older highways, in spite of increased traffic moving at higher speeds. Engineering improvements to vehicles can be classified into two categories: those aimed at keeping vehicles out of accidents; and those which protect the occupants, should one occur. To ensure that vehicles are properly maintained, New Jersey and Pennsylvania require annual inspection of motor vehicles. Due to deregulation, economic pressures on the trucking industry have induced owners to skimp on maintenance, delay repairs, or increase vehicle gross weights. This has contributed to accidents on regional expressways and highways.



Reliable signaling and communications are essential for the safe operation of passenger trains, especially those traveling at high speeds or with short headways. Transit agencies need more effective programs to ensure the personal security of passengers, who should feel safe while using the system.

Air Quality and Energy Conservation

The quality of air in the Delaware Valley region presents a matter of growing concern, as increasing highway travel raises the level of atmospheric pollutants. New anti-pollution strategies, such as improved catalytic converters, effective measures to prevent gasoline vapors from escaping into the air at pumps, more efficient engines, and cleaner alternative fuels are needed.

Transportation relies heavily on petroleum-based fuels. Even though no energy crisis currently exists, an effective conservation program would confer several national benefits, including lowering transportation costs, reducing inflationary pressures, improving the balance of trade, and enhancing air quality.

Future Technology

Technological developments can help planners cope with future traffic demands and allow transit operators to provide innovative service that will attract riders. New highway management techniques emphasize improving traffic flow and providing driver assistance in order to maximize the potential of existing roadways. In public transportation, technological innovations such as automatic fare collection, vehicle monitoring, and train control would attract passengers, increase operational efficiency, and improve cash flow.

Funding Requirements

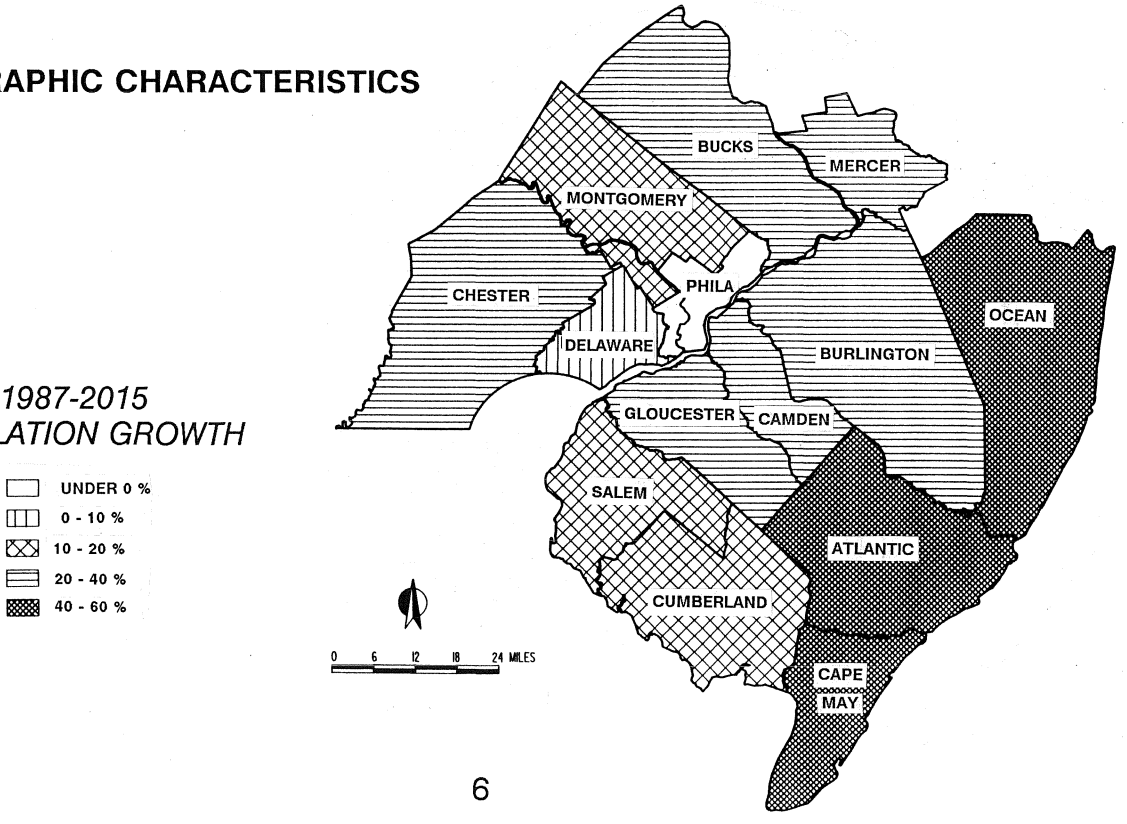
In order for the region's transportation infrastructure to provide adequately for the needs of the Year 2015, about $7.5 billion and $6.6 billion respectively should be spent during the intervening period for improvements to the highway and public transportation systems. In addition, it is estimated that public operating costs, which include maintenance, will total $4.2 billion for highways and $19.2 billion for transit during the same period. However, the anticipated funding level for highway and public transportation facilities does not now provide for many necessary projects, and analysis of current spending suggests that the region will experience a shortfall of about 40 percent. The challenge is to develop a joint federal, state, and local program which effectively addresses the emerging transportation needs of the region. The private sector must also play a greater role in these efforts in the future.

The Federal Role

Past federal highway programs have been instrumental to the planning and construction of an extensive national highway system, including Interstate facilities, primary highways, and urban extensions. In addition, federal transit programs have provided funding for the planning, improvement, and operation of the transit system in the Delaware Valley region. Without such support, the transportation systems would be far less extensive and in far worse condition. However, the Interstate program is now coming to an end, and the federal government has cut transit assistance substantially during the 1980s. The revenues that accrue to the Highway Trust Fund should be spent as soon as possible on highway and public transportation projects and not held in reserve in order to achieve a paper reduction of the federal budget deficit.

DEMOGRAPHIC CHARACTERISTICS

1987-2015
POPULATION GROWTH



The demand for transportation derives largely from population and soci-economic characteristics such as number of households, employment, and car ownership. Regional population in the DVRPC nine-county area is expected to grow from 5.2 million to 5.8 million in the 28 years between 1987 and 2015. The four New Jersey counties should each experience growth in excess of 20 percent, while in Pennsylvania growth will be about seven percent.

Employment across the region is expected to increase somewhat faster than population, as the current trend toward two-earner households continues. The regional increase should be slightly less than 20 percent, with the number of jobs increasing at 30 percent in New Jersey and 16 percent in Pennsylvania.

The number of households is forecast to increase by almost 17 percent between 1987 and 2015 for the DVRPC region as a whole, with the five Pennsylvania counties growing by 12 percent and the four New Jersey counties by 30 percent. Average household size in 2015 is estimated to range from 2.6 to 2.9.

Regional Indicators
(millions)

	1987	2015	Change
Population	**5.2**	**5.8**	**12%**
Employment	**2.6**	**3.1**	**20%**
Households	**1.9**	**2.2**	**17%**
Cars	**2.5**	**3.1**	**25%**

The total number of cars in the region is expected to increase from 2.5 million in 1987 to 3.1 million in 2015. This will place growing stress on the highway network unless capacity increases. Even though the fraction of carless households continues to decline, there will still be 367,000 households in the region without cars (almost 17 percent of the total), which will fuel a strong residual demand for public transportation.

For the five Southern New Jersey counties outside the DVRPC region, the 1987 population (908,700) is forecast to increase by 38 percent, and employment (353,800) by 49 percent, significantly faster than the equivalent rates for the DVRPC counties.

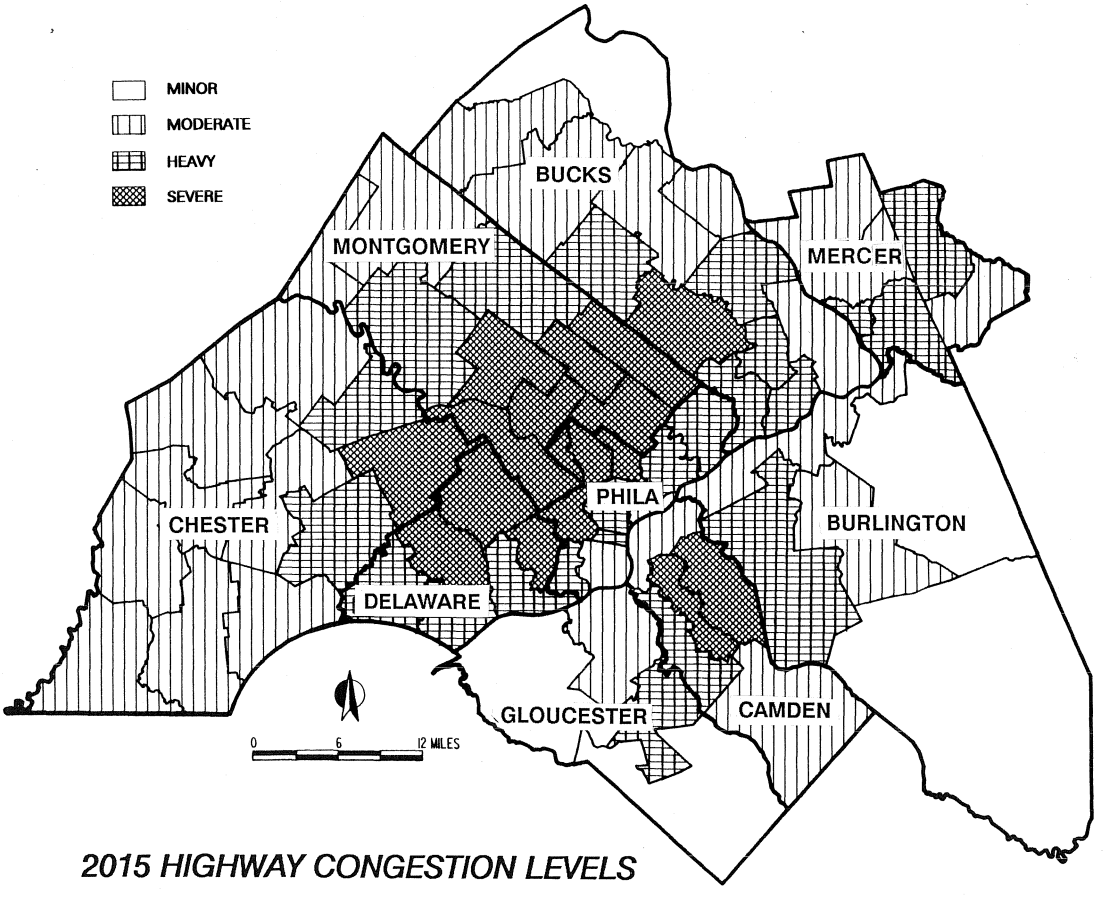
Because of their resort business, the three coastal counties in Southern New Jersey experience large seasonal fluctuations in residency and economic activity. Typically, the summer population of beach communities will exceed that measured in the winter by a factor of ten, but recent years have seen a dampening of the seasonal effect as the shore area has become increasingly attractive for retirement and many vacation homes have been converted to year-round occupancy. In addition, the introduction of casino gambling to Atlantic City has contributed to a leveling of the seasonal component in Atlantic County, as well as driving strong economic growth and rearranging area commuting patterns.

YEAR 2015 TRAVEL DEMAND

In total about 18 million person-trips are projected to be made within the Delaware Valley region on an average weekday in the Year 2015. Of the daily person-trips, 4.4 million will be home based work trips. Total internal trip making is projected to increase by almost 17 percent over the 28-year period between 1987 and 2015. In addition, about 1.1 million auto trips will be taken daily across the borders of the region, as well as 2.5 million truck and taxi trips within the region.

Regional Travel
(Daily trips in thousands)

	1987	2015	Change
Auto Driver	**10,182**	**12,048**	**18%**
Transit	**895**	**911**	**2%**
Truck	**1,876**	**2,289**	**22%**
Taxi	**156**	**180**	**15%**

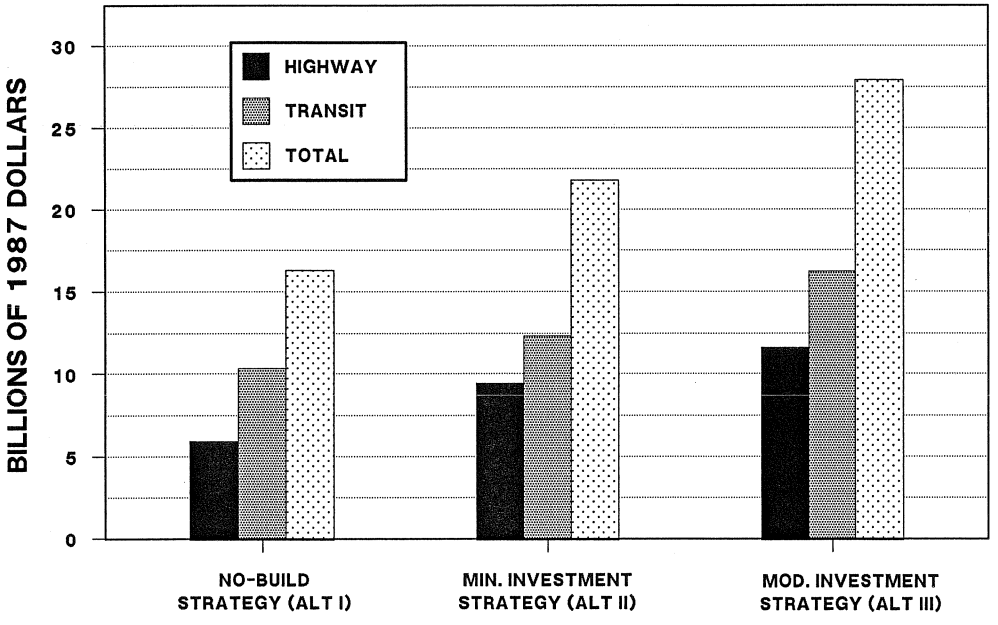


2015 HIGHWAY CONGESTION LEVELS

It is anticipated that about 103 million vehicle-miles of travel will be recorded daily in the region, 29 percent more than in 1987. Traffic in suburban and rural areas will grow much faster than in old urban centers and will create severe congestion.

Transit ridership is projected to increase by two percent, to slightly more than 900,000 trips on an average weekday, though transit's share of regional trips is projected to decline slightly from six percent in 1987 to five percent by the Year 2015. This decline primarily results from the projected growth of residential and commercial activity in suburban and rural areas unserved by transit. About 59 percent of trips to and from Center City Philadelphia are now carried by public transportation; this is not expected to change significantly. When measured in passenger-miles, average weekday transit travel for the region is expected to increase by three percent. As a result of the continuing suburbanization of travel, trip lengths are expected to be longer and load factors lower than current levels.

ALTERNATIVE TRANSPORTATION INVESTMENT STRATEGIES



1989-2015 TOTAL PUBLIC INVESTMENTS

Three alternative transportation investment strategies were developed for the highway and public transportation systems, with capital, operating, and maintenance costs projected to the Year 2015. Alternative I, the No-build Investment Strategy or "Do-Nothing" Alternative, assumes no new transit and highway facilities will be built, except for those facilities currently under construction and those needed to operate the existing transportation system safely at a minimal level of service. Alternative II represents essentially a Minimum Investment Strategy based on recent Transportation Improvement Programs (TIPs) and the Year 2000 Transportation Plan. It consists of committed major

facilities needed to complete missing highway and transit segments vital to traffic flow and passenger service, as well as facilities and improvements programmed in recent TIPs. Alternative III, the Moderate Investment Strategy, basically incorporates Alternative II plus additional investment in new facilities. These new facilities will improve the efficiency of the transportation system and provide better services for both highway and public transportation users.

Under Alternative I, the No-build Strategy, $2.5 billion of capital investment will be needed for the highway system and $2.4 billion for public transportation. Additional public funds of $3.5 billion and $8.0 billion will be needed to operate and maintain the respective systems. Alternative II raises capital requirements to $5.6 billion for highways and $4.0 billion for transit, and cumulative ongoing operating and maintenance expenses to $3.9 billion and $8.4 billion, respectively. Alternative III requires $7.5 billion in new capital for highways and $6.6 billion for public transportation. Public expenses for operations and maintenance will total $4.2 billion and $9.7 billion for highways and transit, respectively.

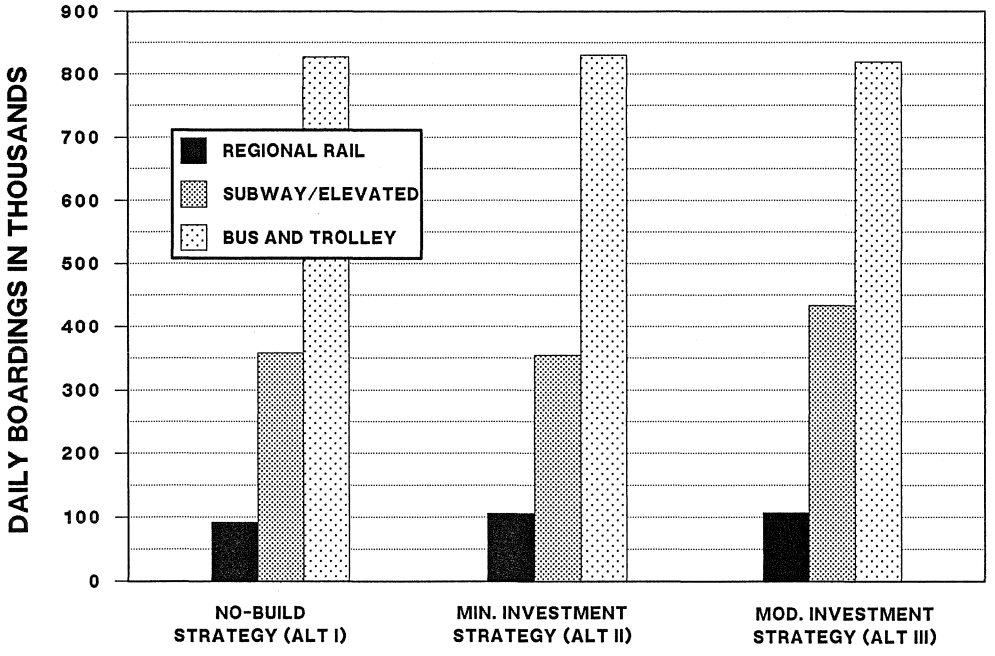
IMPACTS OF THE PROPOSED ALTERNATIVE TRANSPORTATION INVESTMENT STRATEGIES

The transportation and non-transportation impacts of the three investment alternatives were evaluated at the regional level. Alternatives II and III were compared to Alternative I, the no-build option.

Since overall travel demand is assumed to be intrinsic in all three scenarios, the number of daily auto trips varies only slightly, decreasing by less than one percent in Alternatives II and III. This is balanced by a corresponding increase in transit trips of two percent in Alternative II and three percent in Alternative III. When comparing Alternative II to the 1987 level, auto driver trips are expected to increase by more than 18 percent, while transit trips will increase by only about two percent. While there is little difference in vehicle-miles of travel between the alternatives for the region as a whole, the higher investments involved in the two build alternatives (II and III) make travel easier by reducing congestion, raising speeds, and lessening aggravation. The average daily speed for the highway system is about four percent higher in Alternative II and eight percent higher in Alternative III than the No-Build Alternative. The increases in passenger-miles of transit travel are four percent in Alternative II and eight percent in Alternative III, reflecting the improved transit services provided by the two build alternatives.

Alternatives II and III also show some improvement with respect to safety. Both reduce traffic accidents by about four percent and fatalities by five percent. With respect to air quality, the 2015 alternatives differ by relatively small amounts. Alternatives II and III reduce CO by only one percent and four percent, respectively, and other pollutants by six percent and seven percent. Fuel consumption is expected to decline by approximately six percent between 1977 and 2015, which is particularly impressive when considering the expected 79 percent increase in vehicle-miles traveled between 1977 and 2015. The declinee in fuel consumption is attributed primarily to a predicted doubling of the fuel efficiency of automobiles.

TRANSIT BOARDINGS BY SUBMODE



Annual highway costs paid by users do not differ significantly between alternatives and will amount to about $6.3 billion in the year 2015, with users saving only about two percent if one of the build alternatives is chosen. The cost per passenger-mile totals slightly less than 18 cents per mile.

Travel Indicators

	1987	2015 Alt.III	Change
Average Daily Highway Speed (mph)	24.4	24.2	-1%
Auto Cost (¢/pass-mile)	17.6	17.7	1%
Average Daily Transit Speed (mph)	18.0	19.3	7%
Transit Cost (¢/pass-mile)	21.8	22.6	4%

Transit user costs equal the fares paid on the system. For the Year 2015 these will total about $346 million per year in Alternative I, $365 million in Alternative II, and $385 million in Alternative III. Since the cost per passenger-mile remains almost constant at 22 cents, the differences between alternatives largely reflect patronage.

This analysis indicates that the Moderate Investment Strategy (Alternative III) would satisfy the needs of motorists and public transportation users, and therefore should be considered in the development of long-range plans and programs for the region.

RECOMMENDATIONS

In order to achieve the stated goals and meet the needs of the region's motorists and transit riders through the Year 2015, the following recommendations should be considered in the development of long-range plans and programs. These major strategies should be implemented to meet future mobility requirements and to enhance economic development:

The Highway System

- Develop a strategic highway system of national significance that maintains existing expressways, completes missing links, and improves primary arterials in the suburbs
- Improve maintenance and operation
- Implement low cost Transportation System Management projects
- Improve highway access to major activity centers
- Improve signing

The Public Transportation System

- Improve the existing rail system
- Modernize depots, yards, and shops
- Streamline fare structures and collection procedures
- Restructure bus routes to reflect current markets
- Encourage the formation of Transportation Management Associations (TMA)
- Expand rail and bus service to growing areas

Freight Transportation

- Increase overhead bridge clearances
- Expand state programs assisting shortline rail operators
- Modernize terminals and cargo handling facilities
- Unify administration for Delaware River ports
- Improve truck circulation on local streets
- Develop an effective marketing program for the ports
- Define a regional network of truck routes

Land Use Development

- Develop a regionwide growth management policy
- Coordinate land use plans with transportation plans
- Encourage counties to maintain master plans
- Coordinate zoning policies between adjacent municipalities

Safety and Security

- Improve driver skills and attitudes
- Improve passenger security in transit stations and aboard trains, trolleys, and buses
- Upgrade rail signaling and communication systems
- Remove hazards from older highways
- Ensure roadworthiness of vehicles

Air Quality and Energy Conservation

- Continue state vehicle inspection programs
- Improve emission and vapor controls
- Increase car and van occupancy
- Expedite flow of high occupancy vehicles
- Increase transit patronage
- Encourage use of pedestrian and bicycle modes
- Improve taxi and truck circulation on local streets

Future Technology

- Improve motor vehicle efficiency and control
- Improve user information aids for motorists and transit riders
- Develop advanced signaling and train control systems
- Develop responsive traffic control systems
- Encourage automatic fare collection
- Improve electric rail traction efficiency
- Use fleet monitoring systems to improve bus dispatching
- Introduce ramp metering on major expressways

Funding Requirements

- Increase federal and state fuel taxes
- Increase vehicle registration fees

	Proposed Increases in Taxes and Fees	
	Alt. II	Alt. III
Federal Gas and Diesel Fuel	**6¢/gal**	**9¢/gal**
State Gas and Diesel Fuel	**3¢/gal**	**6¢/gal**
PA & NJ Auto Registration	**$3/year**	**$6/year**

- Encourage public/private partnerships
- Establish a transportation trust fund for Southeastern PA
- Impose impact fees on new development
- Establish highway toll districts

The Federal Role

- Place the highway trust fund on a permanent basis
- Increase federal transit operating assistance
- Strengthen the regional transportation planning process
- Maintain the federal role in funding of major capital projects
- Increase research and development programs

All of these recommended strategies, measures, and programs should be implemented to meet future mobility requirements and enhance economic development. Such strategies could be modified, combined, or adjusted to produce a package of programs which achieves a balanced transportation system and provides adequate service for highway and transit users throughout the Delaware Valley Region and Southern New Jersey.

Cover photograph courtesy of Carlton Read and the Delaware River Port Authority. Photo depicts the Benjamin Franklin Bridge over the Delaware River between Camden, NJ and Philadelphia, PA.