# **MOVING PEOPLE AND GOODS**

# Transportation Element of the DVRPC Year 2020 Plan









DELAWARE VALLEY REGIONAL PLANNING COMMISSION

# MOVING PEOPLE AND GOODS TRANSPORTATION ELEMENT OF THE DVRPC YEAR 2020 PLAN

Direction 2020 Report No. 24



Delaware Valley Regional Planning Commission The Bourse Building - 8th Floor 111 South Independence Mall East Philadelphia, PA 19106-2515

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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 1990s 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.

# DELAWARE VALLEY REGIONAL PLANNING COMMISSION

## **Publication Abstract**

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#### **Geographic Area Covered:**

Bucks, Chester, Delaware, Montgomery counties and the City of Philadelphia in Pennsylvania; Burlington, Camden, Gloucester and Mercer counties in New Jersey

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## ABSTRACT

This plan is the adopted long range transportation plan for the nine county region prepared in accordance with the requirements of the Intermodal Surface Transportation Efficiency Act and in conformity with the requirements of the Clean Air Act Amendments of 1990. It contains a financially constrained set of regionally significant projects and policies as well as a listing of future studies which are intended to accomplish regionally adopted goals for the transportation system in light of future demand for this system as studied for the target year of 2020.

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# ABBREVIATIONS USED IN THIS DOCUMENT

CAAA	Clean Air Act Amendments of 1990				
CBDs	Central Business Districts				
CFR	Code of Federal Regulations				
CMAQ	Congestion Mitigation and Air Quality				
CMS	Congestion Management System				
DOT	Department of Transportation				
DRPA	Delaware River Port Authority				
DVRPC	Delaware Valley Regional Planning Commission				
EB	Eastbound				
EPA	Environmental Protection Agency				
ETRP	Employer Trip Reduction Program				
FAA	Federal Aviation Administration				
FRA	Federal Railway Administration				
FTA	Federal Transit Administration				
GMTF	Goods Movement Task Force				
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991				
IVHS	Intelligent Vehicle Highway Systems				
LRT	Light Rail Transit				
MIS	Major Investment Study				
MPO	Metropolitan Planning Organization				
NHS	National Highway System				
NJDEP	New Jersey Department of Environmental Protection				
NJ DOT	New Jersey Department of Transportation				
NPIAS	National Plan of Integrated Airport Systems				
PA DER	Pennsylvania Department of Environmental Resources				
PATCO	Port Authority Transit Corporation				
PennDOT	Pennsylvania Department of Transportation				
PTAF	Public Transportation Assistance Fund				
PUT	Pottstown Urban Transit				
SEPTA	Southeastern Pennsylvania Transportation Authority				
SIP	State Implementation Plan				
STP	Surface Transportation Program				
SOVCAP	Single Occupant Vehicle Capacity				
TCM	Transportation Control Measure				
TDDs	Transportation Development Districts				
TIMS	Transportation Incident Management System				
TIP	Transportation Improvement Program				
TMA	Transportation Management Association				
TTF	Transportation Trust Fund				
UPWP	Unified Planning Work Program				
U.S.C.	United States Code				

**VMT** Vehicle Miles of Travel

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#### SUMMARY

This document, *Moving People and Goods*, presents a comprehensive longrange transportation plan for the Delaware Valley Region to the year 2020. It contains a set of policies, a list of projects and a proposal for major studies. These recommendations result from an extensive public outreach program. They promote air quality objectives and match anticipated funding levels.

Moving People and Goods fulfills federal requirements for preparation of a longrange transportation plan by the metropolitan planning organization. The investments and initiatives cover all modes including public transit, highway, bicycle and pedestrian, aviation and freight.

#### THE NEED FOR A TRANSPORTATION PLAN

According to DVRPC projections, the number of personal vehicles available to area residents will increase by one million over the 1990 number to 3.8 million. Growth in auto ownership in the New Jersey counties will be particularly acute—almost 50%. This rise is attributable to both an increase in population, and a higher rate of auto ownership. For every 100 persons in 1990, there were 53 automobiles; in 2020, 100 persons will own 65 automobiles.

A continuation of the trends in which residential and employment growth is dispersed throughout the outer areas of the region will further tax the region's network of highways. Automobile tripmaking will increase and so will the average trip length. As residents and jobs become more scattered, it becomes more difficult to effectively accommodate hometo-work travel with transit service. Consequently, if recent trends were allowed to continue, a decline in the total number of transit trips in the region would be expected.

Not only will trip-making increase for residents of the region, but travel *into* the region is anticipated to grow 44% in the thirty-year period. This increase is caused not only by the growth of interstate travel, but also by an increase in commuter trips into the region as employment sites on the periphery continue to attract workers who live outside the region.

These increases in vehicles and trips dictate that improvements must be made in the region's transportation facilities.

# LINKING LAND USE AND TRANSPORTATION

In preparing DVRPC's long-range land use and transportation plan - *DIRECTION* 2020 - an important concept was to view the problems of growth and transportation as a single, interrelated condition. Therefore, project teams of transportation and land use planners worked together to prepare the elements of the plan.

Focus was placed on distinct travel and land-use corridors and centers within the region. The corridors usually include several parallel highway and transit routes while centers often represent locations where transportation facilities converge. A planning process was developed in which the best transportation and land-use solutions would be recommended in the context of the surrounding development and regional travel patterns.

The *Centers and Corridors* study assembled a plan for each corridor and center, showing conditions, trends, and problems and land use and transportation recommendations. Maps showing existing land use and transportation facilities were prepared for each center and corridor. A draft was then circulated to member governments and agencies as well as other interested parties. During the review process, projects were described as either short- or long-term based upon need and perceived acceptability.

#### MOVING PEOPLE AND GOODS

This document, *Moving People and Goods*, details the regionally significant policies and projects needed to support and influence the anticipated growth in travel. The plan conforms to federal guidelines, including the Intermodal Surface Transportation Efficiency Act (ISTEA) and the Clean Air Act Amendments of 1990 (CAAA). Specifically, the fifteen "planning factors" listed in the metropolitan planning regulations were considered.

#### **Policies**

The first step in the planning process was to establish goals and objectives. Next, policies were developed to accomplish these goals and objectives. Twelve of the policies relating to transportation are listed in the report together with the strategies recommended to make them effective. Finally, 80 specific actions, together with the responsible agency, are listed.

#### **Programs**

Recognizing the enormous worth of the region's present transportation systems, the Plan puts forth three programs to provide for their ongoing management. Managing the transportation assets involves two tasks: First, and most critical, is the *preservation* of the current system. The second aspect involves more effective use of the system through the use of *intelligent transportation systems* (i.e., advanced communication technologies) and *demand management* strategies.

The Plan encourages several types of strategies which are aimed at improving mobility by lowering the demand for travel. These travel demand management (TDM) strategies foster increased efficiency of the transportation system by influencing employee travel behavior by mode, time, frequency, trip length or route.

#### Components of a DVRPC Travel Demand Management Program

Ridesharing Park and Ride Lots Parking Management/Pricing Bicycle/Walking Facilities Guaranteed Ride Home Staggered Work Hours (Flextime) Compressed Work Week Telecommuting Public Relations and Education

#### Projects

Roughly 200 projects which serve the goals of the plan emerged from the planning process. These include the following major projects to be completed in the short-range — prior to 2005, by which time the region is to meet air quality standards for ozone:

Burlington-Gloucester Transit Line Chestnut Street Transitway restoration FastShip Terminal I-95 reconstruction from NJ to DE I-95 interchange at I-276 (PA Turnpike) I-95 interchange at Aramingo/Torresdale Market-Frankford Line renovations NJ 92 construction (Hightstown Bypass) Newtown rail line restoration North Philadelphia light rail conversions PA 63 (Woodhaven Road) completion Philadelphia International Airport runway Regional rail line extension to Wawa 15 transportation centers 22 other corridor improvements

After 2005, but before the horizon year of the plan, 2020, the following major projects will be completed:

Atlantic City Expressway at CR 689 Market West Subway Station US 202 Montgomeryville to PA 611 Bypass 3 transportation centers 13 other corridor improvements

In addition to these major projects, systemwide improvements include reconstruction of existing facilities, transit facilities and vehicles, bicycle and pedestrian improvements, park-and-ride lots, ramp construction, signal systems and signing, intersections and spot locations, access controls, and congestion management systems.

#### **Recommended Studies**

The Plan also recommends a series of studies. In some instances, the nature of an improvement to meet an identified transportation need is not known in sufficient detail to warrant inclusion in the Plan as a project. In other cases, a major investment study (MIS) must be completed before certain anticipated large highway or transit projects may receive federal funds.

MISs are required to ensure that a regional need is apparent after a detailed examination of alternatives. The Federal Transit Administration and the Federal Highway Administration have specified the types of projects which require an MIS. Projects in the plan which require a major investment study (MIS) include the following:

Burlington-Gloucester Transit Lines I-95 Intermodal Mobility Project I-95/I-276 Interchange NJ 92 (Hightstown Bypass) PA 63 Woodhaven Expressway Extension US 202—Section 700

As studies are completed and projects identified, *Moving People and Goods* will be updated.

#### FOCUSED COMPLEMENTARY PLANS

In addition to the preparation of *Moving People and Goods*, DVRPC is completing plans for three other transportation elements—airports, bicycles & pedestrians, and freight travel. The policy and project recommendations from these plans are included in the Plan.

#### Aviation Plan

The Year 2020 Regional Airport System Plan offers a comprehensive examination of airport system needs. Much like the approach taken towards highways in Moving People and Goods, the major emphasis of the plan is on preserving the existing airport system, with a few significant increases in capacity. Total projected cost of the plan is \$740 million.

#### **Highlights of the Aviation Plan**

- Prompt Federal Aviation Administration (FAA) funding assistance for the addition of runway 8-26 at Philadelphia International Airport
- Public acquisition of privately-owned airports which are critical to the needs of suburban areas or as additional reliever facilities
- Expanded ramp space, hangars and runway lengths at selected airports to accommodate business aircraft needs
- Enhanced NAVAIDS and precision approach capabilities where needed for business aircraft
- Additional heliport capacity in central business districts to supplement existing capacity at Philadelphia International Airport

#### Bicycle and Pedestrian Mobility Plan

The Bicycle and Pedestrian Mobility Plan identifies a vision—goals and objectives—to promote the creation of a 1900-mile bicycle network and to improve pedestrian access in Southeastern Pennsylvania. Land use, transportation, safety and security, enforcement, education, and funding improvements are also identified. Nearly 1400 miles of routes are specified along state, county and local rights-of-way. More than 350 miles of new, dedicated off-road routes are also planned along with an additional 334 miles of undefined alignments.

The plan will soon be extended to cover the counties in New Jersey.

#### Intermodal Freight Plan

The Intermodal Freight Plan focuses on intermodal freight systems and facilities in the region. Intermodalism is broadly defined as the movement of goods via two or more modes of travel. This plan is targeted at those commercial aviation airports, waterports, and truck-to-rail facilities where such exchanges of goods occur.

The plan has four primary components. They are:

- A catalogue of regionally significant intermodal facilities and historic usage
- A detailed example of intermodalism
- A vision of the model intermodal freight network in the year 2020
- A set of recommended projects and

studies to improve critical features of the system

One objective of this document is to illuminate fundamental operating aspects of the intermodal transportation environment. This is important because of the unique convergence of private and public interests involved. It is also envisioned as establishing a foundation for effecting and coordinating intermodal freight transportation infrastructure improvements in the Delaware Valley.

#### Highlights of the Freight Plan

- Provision of marine terminal with necessary highway and rail access for the *FastShips* (high speed cargo ship technology) initiative
- Improved highway/rail grade crossings in Delaware County, Bridgeport, Camden, and elsewhere
- Increased rail intermodal capacity in South Philadelphia
- Institution of Electronic Toll and Traffic Management (ETTM) technologies such as *EZ Pass* for commercial and other vehicles
- Timely construction of key highway improvements such as the I-95 reconstruction which have a large impact on freight operations

#### AIR QUALITY CONSIDERATIONS

Federal law requires that urban area longrange transportation plans demonstrate *conformity* with the goal of air quality plans. Transportation plans are said to conform if emissions from highway vehicles decline to specified levels and meet several other tests. Highway emissions in total must be (a) less than they were in 1990, (b) less in the case that the projects in the plan are completed than if they are not, and (c) less than any emissions budgets established by the states.

The conformity demonstration to be conducted must meet federal and state rules. The rules include the use of complex travel demand modelling techniques and the latest version of the federal emissions model. Finally, the work must be done in consultation with transportation and environmental agencies and in view of the public.

In the demonstration of conformity, most of the reductions in emissions from highway vehicles are attributable to technological improvements such as federal motor vehicle controls, reformulated fuels, and emissions inspection and maintenance programs. However, the transportation improvements in the plan also help improve the air.

Together, these factors permit a 75% decline in the emissions in spite of increasing vehicle ownership and vehicle travel. Between 1990 and 2020, the number of vehicles per person is anticipated to increase by 22% and travel miles per person by 19%. The improvements in the plan allow the average speed on the region's highways to remain relatively unchanged.

#### FINANCIAL PLAN

#### What Will the Plan Cost?

DVRPC estimates the cost of the *Moving People and Goods* facilities and programs to be about \$21.0 billion in 1995 dollars. The bulk of the cost will be for operating and maintaining the present highway and transit systems, although a sizeable portion will be allocated to new transit facilities and services. Most of the funding for highways is devoted to relieving congestion, providing new connections, allowing for freight travel and making better use of existing roadways.

#### How Will the Plan be Paid For?

Roughly \$21 billion is anticipated to be available from traditional sources over the 25-year period. This estimate assumes periodic reauthorization of the federal surface transportation act at current levels and makes the further assumption that there will be the necessary increases in the sources of these funds—both basic and matching.

As a result we can say that the recommendations of the plan have been constrained to reasonably anticipated resources. However, it needs to be emphasized here that the recommendations of the plan are not intended to be viewed as a complete picture of the region's transportation needs. As an illustration of this point, the effort was made to determine the costs associated with some realistic projects which may evolve from the recommended studies list. This exercise yielded an additional \$9.4 billion in potential improvements which have no current funding source. Such work would need to either replace existing projects in the plan or make use of new funding sources in order to be accomplished. The citizens of the region are encouraged to help their elected officials decide how the region should proceed. 

#### I INTRODUCTION

The safe and reliable provision of transportation for people and goods is a daily matter of economic and social wellbeing and often of life itself. During the afternoon and evening of Thursday, July 14, 1994, the Philadelphia metropolitan area experienced a strong reminder of the importance of its transportation network to daily living and the fragile nature of that network. A powerful thunderstorm swept through the region, flooding roads and disrupting electrical and communication systems. More than five inches of rain fell in Bala Cynwyd in just one-half hour. PECO Energy noted more than 4,000 lightning strikes in its service area in just one hour.

The impact of these conditions on area roads was described in the *Philadelphia Inquirer* by one motorist as "exquisite gridlock" as drivers were stuck for hours in localized, flooded areas and as open roads became overwhelmed by diverted traffic. The Schuylkill Expressway was closed by 6:00 p.m. when it became flooded between Montgomery and City Avenues. The Walt Whitman Bridge, as well as part of I-95, were also closed.

All of SEPTA's regional rail and subwaysurface lines were shut down until shortly after 8:00 p.m. The regional rail problems were due in large part to a lightning strike which destroyed a transformer at Wayne Junction and a malfunctioning converter (which moves trains from one track to another). The Broad Street subway was also closed north of Girard Station due to flooding. SEPTA's central computer system was also disabled during the storm, breaking communication between the agency and its bus drivers. At 5:30 p.m., four people were struck by lightning as they stood in water waiting for a SEPTA bus at Broad Street and Erie Avenue.

Perhaps the most frightening aspect of the severe weather and the loss of transportation was felt in New Jersey as flooding took on more dramatic proportions. Two police officers in Camden, after rescuing an elderly couple from a deluged car, returned to their cruiser to find that it had floated several blocks away. Over 150 calls for assistance went unanswered in Cherry Hill as the township patrol cars sat in four to six feet of water.

While this incident is by no means the most dramatic experienced in the region, it does demonstrate that extreme weather, as well as problems with the existing network and human error, have periodically created or exacerbated transportation disruptions. Because it is subject to the imperfections of man, machine and environment, transportation can never be made either perfectly safe or perfectly reliable. Rather, it is in realizing the importance of transportation to our daily lives that we seek to improve its safety, efficiency, and reliability recognizing our imperfect environment and limited resources.

As part of its mission, the Delaware Valley Regional Planning Commission brings together federal, state, and local governments and other transportation providers in the nine county Delaware Valley area to provide for the coordinated planning of future transportation improvements. The DIRECTION 2020 initiative is set forth in a series of documents and provides detailed longrange guidance for both the transportation network and for future land development patterns to further optimize its use. This portion of DIRECTION 2020, *Moving People and Goods*, summarizes the planned policy and network changes to improve regional transportation that are found in greater detail in *An Agenda for Action*, Report No. 21 and *Land Use and Transportation Plan: Centers and Corridors*, Report No. 22.

#### THE MPO PROCESS

The *Moving People and Goods* portion of the DIRECTION 2020 initiative serves as the official, adopted long range plan for the metropolitan planning area as required by federal regulation.<sup>1</sup> In this regard, long range plans help to direct regionwide transportation decision-making for urban areas of the country over a period of at least 20 years. These policy documents are adopted by consensus of the affected local governments in concert with state transportation agencies, transit authorities and other parties, through the forum of the Metropolitan Planning Organization (MPO).

An MPO's jurisdiction may cover all of the existing urban area defined in the U.S. census and any additional area presumed to become part of the urban area over the 20 year planning horizon. If an MPO exists in an area where the air quality falls below federal Clean Air Act standards for either ozone or carbon monoxide pollutants (such areas are referred to as *nonattainment areas*), the entire area that fails to meet these standards must be addressed. More than one MPO may exist in a nonattainment area if the governor(s) "determines that the size and complexity of the urbanized area" justifies such multiple designations,<sup>2</sup> but planning efforts must be coordinated to achieve federal objectives.

Long range plans do not specify the design of actual projects. Rather, they identify future needs to address transportation deficiencies. Identification of specific projects to be undertaken is accomplished in a separate document published annually or biennially by the MPO, entitled the Transportation Improvement Program (TIP). Projects to receive federal funding must appear in an urban area's TIP. For any individual project, one prerequisite for inclusion in the TIP is that such a project must be "consistent with the long range plan".<sup>3</sup> This means the project must be explicitly cited in the plan or be consistent with its policies.

For MPOs in air quality nonattainment areas and those encompassing populations in excess of 200,000 people, the MPO is extended additional authority to allocate, in consultation with state officials, available

<sup>&</sup>lt;sup>1</sup>Title 23 of the United States Code, Section 134, Subsection (g) (23 U.S.C. §134 (g)) and Title 23 of the Code of Federal Regulations, Section 450.122 (23 CFR §450.122).

<sup>&</sup>lt;sup>2</sup>23 U.S.C. §134 (b)(6) <sup>3</sup>23 U.S.C. §134 (h)(5)

federal dollars to the projects in its TIP.<sup>4</sup> This recent revision to federal law gives added importance to initiatives developed within the MPO long range plan which are carried forth in later TIPs.

Incumbent with this enhanced role for long range plans in metropolitan areas comes more stringent requirements for plan contents. To some degree, interpretation of these requirements is intended to allow flexibility in the plan contents being extended to the MPOs owing to their varying magnitudes of needs and resources. It is also anticipated that further definition of the regulations will take place as federal review agencies, MPOs and other concerned parties work toward a common understanding and as new planning tools emerge. An example of such a requirement is the need to incorporate public comment in the planning process. Certain minimal conditions are prescribed for the timely provision of public participation. However, it is recognized that the actual methods to offer public participation will vary greatly depending on the size of the region and other factors.

The preparation of all transportation plans and programs by MPOs, including the long range plan and TIP, must first take into consideration fifteen planning factors. These factors insure that plans for the various regions strive toward the common national goals of: increased efficiency, conservation of resources, system continuity, accessibility, and feasibility.

<sup>4</sup> 23 U.S.C. §134 (i)(4)

The long range plan is further defined in the regulations in both scope and methodology. Plans are required to consider all major highways, transit lines, other modes, as well as "multimodal" and "intermodal" facilities in identifying and evaluating an *integrated transportation* system. Plans must identify both long range and short range strategies and actions required to address the anticipated demand over a 20 year minimum planning horizon. Plans are further required to identify all adopted strategies to manage congestion that impact the system as well as pedestrian, bicycle and enhancement activities, as appropriate. Plans must stipulate all assumptions used in treating *major investments* in the transportation network in the absence of detailed alternatives analysis. A financial plan must accompany the document which compares the costs of the entire system with the projected available revenues. Any shortfall of revenues must be identified through specific new funding strategies anticipated to be available during the planning period. Moreover, the plan needs to reflect the input of public agencies, private transportation providers and other interested parties, as well as the general public, through early and continued participation in the plan development.

Long range plans for urban areas in air quality nonattainment areas have additional requirements. MPOs in these areas must coordinate the development of long range plan recommendations with the development of transportation control measures (TCMs) incorporated in State Implementation Plans (SIPs), as required by the Clean Air Act. These TCMs are ,



intended to help the region meet its air quality goals through improved transportation system performance. In the DVRPC region, TCMs are identified through a joint process with the Pennsylvania and New Jersey transportation departments as well as county and other officials assisting with development of specific types of TCMs. Long range plans must also be prepared in sufficient detail so that a finding of conformity with EPA regulations can be made. Lastly, the financial plan component must explicitly provide for completion of the activities needed to achieve conformity with air quality requirements.

#### **DVRPC** AS THE LOCAL MPO

The Delaware Valley Regional Planning Commission (DVRPC) was formed in 1965 by an interstate compact between Pennsylvania and New Jersey to plan for the orderly growth and development of the region, and to respond to regional issues and needs. The region includes the counties of Bucks, Chester, Delaware, and Montgomery and the cities of Chester and · · · ·



Philadelphia (which is also a county) in Pennsylvania as well as the counties of Burlington, Camden, Gloucester, and Mercer and the cities of Camden and Trenton in New Jersey. As can be seen in the figures of population and employment by jurisdiction, the DVRPC region represents a wide range of demographic conditions. Population densities vary from a low of 489 people per square mile in Burlington County to 12,668 people per square mile for the City of Trenton. Also, the persons to jobs ratio, an approximate measure of the distribution of jobs relative to the work force, varied widely from the regional average ratio of 1.92. These range from 1.39 people per job for the City of Trenton to 2.83 people per job for the City of Chester, which suffered major employer emigration during the 1970s. From the data presented, it is apparent that, with the exception of Trenton, the most densely populated jurisdictions do not coincide with those that have the lowest population to jobs ratio. To some degree, this is a function of the geographic configuration of the counties. It does, however, reflect a continuing trend of exodus by employers from the densely populated urban centers. The implication for the region is that major employment centers (which need to draw workers from the rest of the region) are increasingly found in areas with low population densities that are poorly suited to conventional transit service.

The census defined Consolidated Metropolitan Statistical Area (or CMSA) for the region extends beyond the DVRPC planning area boundaries affording multiple opportunities for intraregional dialogue and coordination. The CMSA also includes Cecil County in Maryland, New Castle County in Delaware, and Cumberland and Salem counties in New Jersey. The Philadelphia nonattainment area also includes Kent County in Delaware.

Long range planning for Cecil County, Maryland and New Castle County, Delaware is accomplished through the Wilmington Area Planning Council, which serves as the MPO for these jurisdictions. Similarly, Salem and Cumberland counties in New Jersey have enrolled in a newlyformed MPO including Atlantic and Cape May counties, known as the South Jersey Transportation Planning Organization. **DVRPC** maintains a staff-level dialogue with these two planning bodies as well as their associated state transportation departments. Further coordination with the New Jersey counties is enabled through New Jersey Department of Transportation representation on the DVRPC Board of Commissioners, committees and working groups. Long-range planning for Kent County is conducted by the Dover/Kent County MPO and is coordinated with the Wilmington MPO. The input of longrange initiatives in Kent County upon the

DVRPC region is limited, as it is not adjacent to the region.

All MPOs are required by federal law to develop a Transportation Improvement Program (or TIP) either annually or biennially. The TIP is a regionally recognized schedule of all transportation projects—both highway and transit—intended to receive federal funding. The TIP must cover at least a three-year period and must be financially constrained to reasonably anticipated resources. The TIP must also be shown to conform with air quality guidelines for the region.



Amtrak 30th Street Station, Philadelphia



The DVRPC TIP is compiled and evaluated annually. It covers a four-year period in Pennsylvania and a five-year period in New Jersey. Candidate projects are first submitted by state DOTs, member governments and transit operators in accordance with federal guidelines. Projects are then scored by an adopted screening procedure. With suitable opportunities for public comment, projects are listed in the TIP based upon the results of the screening procedure, the requirements of the air quality guidelines, funding limitations, federal mandates and other criteria. In July 1994, the DVRPC Board adopted the final Transportation Improvement Program for fiscal years 1995-98. The FY 1995 TIP identified \$1.9 billion in highway improvements and \$1.7 billion in public transit improvements (in 1995 dollars).

#### MOVING PEOPLE AND GOODS

The Delaware Valley long-range transportation plan, Moving People and Goods, provides a unified framework for the provision of transportation improvements in the region between 1995 and 2020. It details regionally significant policies, programs and facilities needed to support the existing and anticipated growth in travel. It also contains an extensive list of further studies which, when accomplished, will provide further guidance in accomplishing additional important objectives. The facilities and studies detailed in the plan are denoted as either short term or long term to provide some measure of guidance for their coordinated advancement. Projects found

in the adopted FY 1995- 1998 TIP are categorically considered short term.

The Moving People and Goods document represents the culmination of a transportation planning process which satisfies all federally prescribed requirements. The goals and objectives of the planning process, as set forth in Policies for the 21st Century (DIRECTION 2020 Report #2), included consideration of the fifteen mandated planning factors. The following table summarizes the goals, objectives and strategies applicable to each of the factors. Regional policies were then formulated to carry out these objectives and were subsequently detailed in DVRPC Year 2020 Land Use and Transportation Plan: The Policy Agenda (DIRECTION 2020 Report #21). The critique of existing and future travel conditions for each corridor was also structured around the regional goals from the *Policies* document. This critique led to the development of the facilities and studies recommendations found in DVRPC Year 2020 Land Use and Transportation Plan: Centers and Corridors (DIRECTION 2020 Report #22).

# Required Planning Factors<sup>5</sup>

Bhananhe Sheeke	Planning Factor	Regiona	I Goals/Policies/Actions
1	Preserve and maximize use of existing facilities	Policy:	Optimize efficiency of existing transportation systems
2	Conform with energy conservation programs	Policy:	Use transportation demand management techniques for corridor and system planning (see also Planning Factor No. 14)
3	Relieve and prevent congestion	Goal: Action:	Ease traffic congestion through the reduction of single occupant vehicles by better integrating automobile and public transit links, encouraging changes in commuters' travel habits and improving the efficiency of existing transportation facilities and services Encourage transit-oriented land use and mixed- use development
4	Consider the effect of transportation policy decisions on land use and development; consistency with all applicable land use and development plans	Action:	Encourage transit-oriented land use and mixed- use development
5	Program transportation enhancement activities	Action:	Improve and expand bicycle and pedestrian facilities
6	Consider impact of all transportation projects regardless of funding source	Policy: Policy:	Increase the levels of public and private investment in regional freight movement activities Provide more non-auto options for commuters
7	Consider border crossings and access to: ports, airports, intermodal features, freight routes, parks, recreation areas, monuments, historic sites, military installations	Action: Policy: Goal:	Increase the number of multi-modal transportation centers and park and ride facilities Create efficient intermodal freight facilities throughout the region Improve access to and efficiency of the region's transportation network, and ensure the safety and security of the system's users

<sup>5</sup>Refer to 23 U.S.C. §134 (f)(1-15)

International and	Planning Factor	Regiona	al Goals/Policies/Actions
8	Insure connectivity across MPO boundaries	Action: Goal:	Encourage the participation of freight interests in the joint public/private programming of transportation improvements Improve access to and efficiency of the region's transportation network and ensure the safety and
	Dury dala fan management	Deller	Optimize the officiency of the ovicting
9	system identified needs	Policy:	transportation systems
10	Preserve needed rights- of-way	Action: Action:	Establish opportunities for connections among transportation modes Coordinate operations of oversight authorities responsible for freight movement
		Action:	Encourage transit-oriented land use and mixed- use development
11	Enhance freight movement	Goal:	Promote coordination among freight movement interests and development of an intermodal regional freight movement plan with improvements to air, highway, port and rail systems
12	Consider life-cycle costs for bridges, tunnels, and pavement	Policy: Action:	Optimize the efficiency of the existing transportation systems Program and integrate needed freight movement projects into the TIP process
13	Consider the social, economic, energy, and environmental impacts of decisions	Action: Goal:	Encourage transit-oriented land use and mixed- use development Improve the region's air quality by reducing the number of single occupant vehicles, promoting alternative travel modes and encouraging other measures which will limit emissions from mobile sources
14	Expand, enhance, and increase use of transit services	Policy: Action: Goal:	Provide more non-auto options for commuters Promote the use of public transit and ridesharing Improve access to and efficiency of the region's transportation network and ensure the safety and security of the systems' users
15	Increase transit system security	Policy:	Ensure the safety and security of highway and transit users
The Peop for th	recommendations within <i>Mo</i> <i>le and Goods</i> have also been neir impacts on regional air	<i>ving</i> n assessed quality.	Some of the projects were considered in the results of computerized emissions modelling. Others were evaluated by

empirical means. This procedure is further detailed in Chapter V. The results of the conformity determination are summarized within Chapter IX.

No TCMs from either the New Jersey or Pennsylvania SIP remain unbuilt or not programmed. However, revisions of these documents detailing further actions are in preparation and will be reflected in an updated version of this plan in accordance with the federally prescribed three year update cycle for major metropolitan long range plans. A significant number of the recommendations in *Moving People and Goods* are potential TCM strategies and should be considered for inclusion in the SIPs.

The recommendations within *Moving People and Goods* have also been

evaluated with respect to the anticipated financial resources of the region. This includes the completion of the FY 1995-1998 TIP and short term as well as long term recommendations during the overall planning horizon. A discussion of this evaluation is found in Chapter VIII. Given the uncertain nature of predicting future resources, cursory evaluations for individual, large projects and smaller groups of projects based on type were conducted. This resulted in a plan which was constrained to available financial resources rather than address all of the regions needs. These are not meant to constrain the availability of funds to individual projects from year to year. Rather they are meant to provide a long term perspective for desired changes to the overall expenditure of funds. 

#### II METHODOLOGY

#### **OVERVIEW**

The underlying logic of DVRPC's preparation of DIRECTION 2020 was to look at the problems of land use and transportation as a single, interrelated condition. This emerged from both federal requirements for the planning process and in response to observed historical trends (see Chapter IV) linking changes in transportation and land use conditions. As a result, a single plan methodology was crafted to develop both *Moving People & Goods* and the regional land use plan, *Guiding Regional Growth*.

#### **Elements of Plan Methodology**

- Initiate Public Participation
- Develop Goals & Policies
- Develop Actions (i.e., Policy Recommendations)
- Develop Centers & Corridors
- Accumulate Data
- Review with Local Officials & Public
- Assign Centers/Corridors to Project Teams
- Develop Initial Facility Recommendations
- Integrate, Constrain, Test and Revise Recommendations
- Review with Officials & Public
- Finalize Recommendations and Prepare Plan

It was recognized that regional and subregional land use and transportation recommendations would have to be

developed simultaneously and implemented concurrently. Since this was a multidisciplined problem, it was decided to employ project teams working in consultation with each other to prepare the various elements of the plan. This entailed the cooperative efforts of over 20 transportation and land use planners with particular areas of expertise. Although this approach provided a more empirical basis for developing transportation recommendations, it proved highly practical for responding to governmental mandates, developing unified, site specific recommendations and incorporating public comment.

Rather than having a quantitative analysis of deficiencies drive the plan development, analytical tools were used to critique the facility recommendations, recognizing some of the impacts of the land use and transportation policies. A final step in this process will be the incorporation of revised socio-economic projections in the travel forecasting model to further account for the effects of land use and transportation policies. This is anticipated to take place as part of DVRPC's Unified Planning Work Program (UPWP) activities.

In May of 1993, the DVRPC Board adopted a set of regional goals and objectives to frame the development of DIRECTION 2020 land use and transportation recommendations. These goals and objectives will also be incorporated into all subsequent UPWPs to provide direction for all future DVRPC work. These goals and objectives can be found in *Policies for the 21st Century* (DIRECTION 2020 Report No. 2).

The DVRPC Board also established a Board Year 2020 Plan Committee to oversee the progress of long range planning for the region. This committee, which first convened in August, 1992, is comprised of the entire DVRPC Board of Commissioners and meets on an irregular basis to review key elements of the plan as they are prepared. The table below inventories DIRECTION 2020 publications which include the transportation and land use plans as well as supporting documentation and more detailed planning elements for particular areas of concern.

Land use and transportation recommendations were developed from a combined regional (or "top down") and corridor specific (or "bottom up") approach. *Moving People and Goods* brings together the regionally significant aspects of both facets of this planning process.

#### **DIRECTION 2020 Publications to date**

Currently Available:

- 1. Rating the Region, the State of the Delaware Valley
- 2. Policies for the 21st Century
- 3. DIRECTION 2020: The Public Participation Initiative and Policy Statement
- 4. Press Conference Paper
- 5. Journey-to-Work Trends in the Delaware Valley Region, 1970-1990
- 6. Regional Park and Ride Assessment: Highway-Related Facilities

- 7. Regional Park and Ride Assessment: Highway-Related Facilities Supp. 1
- 8. Year 2020 County and Municipal Interim Population and Employment Forecasts
- 9. Transportation Issues and Goals for the Long Range Plan
- 10. Transportation Centers: Concept and Evaluation
- 11. Overview of Transportation Control Measures
- 12. Regional Growth Monitoring-1991
- 13. Delaware Valley Rental Housing Assessment
- 14. Atlas of the Delaware Valley
- 15. Year 2020 Municipal Forecasts of Occupied Housing Units, Vehicle Availability and Employed Residents
- 16. Journey-to-Work Trends in Camden, Trenton, Chester, and Philadelphia 1970-1990
- 17. Journey-to-Work Trends in Eight Suburban Townships 1970-1990
- 18. A Menu of Implementation Options
- 19. Solutions for Affordable Rental Housing in the Delaware Valley
- 20. Linking Land Use and Transportation Planning: Case Studies of Successful Implementation
- 21. DVRPC Year 2020 Land Use and Transportation Plan-The Policy Agenda
- 22. DVRPC Year 2020 Land Use and Transportation Plan-Centers and Corridors (DRAFT)
- 23. Guiding Regional Growth
- 24. Moving People and Goods
- 25. 2020 Zonal Population and Employment Forecasts

Available Soon:

- 26. Regional Growth Monitoring for the Years 1992-1993
- 27. Reinvesting in Cities in Transportation Improvements in Urban Areas

- 28. Southeastern Pennsylvania Bicycle and Pedestrian Mobility Plan
- 29. Intermodal Freight Plan
- 30. Summary of Public Comments DIRECTION 2020 Land Use and Transportation Long-Range Plan
- 31. Year 2020 Regional Airport System Plan

#### **DEVELOPMENT OF POLICIES**

#### **DIRECTION 2020 policy**

recommendations can be found in their entirety in the report DVRPC Year 2020 Land Use and Transportation Plan: The Policy Agenda (DIRECTION 2020 Report No. 21). For each objective included with the eight regional goals (55 in all) a series of implementation strategies to achieve that objective have also been identified. These implementation strategies include the specific legislative, administrative, fiscal or policy changes needed to make each objective a reality. Included are recommendations for changes at the federal, state, regional, county and municipal levels, as well as strategies for transit operating agencies, bi-state agencies, regional authorities, non-profit organizations, and other identified groups.

DVRPC staff first prepared a wide spectrum of candidate regional policies identifying all parties and actions required. A series of these strategies were set apart as regionally significant based on the nature of the changes involved and the degree of impact of the policy on accomplishing the objective. These candidate policies were released as *A Menu*  of Implementation Options (DIRECTION 2020 Report No. 18). This document was distributed to member governments and operating agencies, other identified parties and at all later public participation activities. During this process, policies were evaluated both for content and for their inclusion as regionally significant. Following a lengthy review period, a compatible mix of revised strategies was developed and the draft policy document was released.

The goals, objectives and policies identified represent the collective input of DVRPC, its member governments and operating agencies, and the region's citizens. Future DVRPC work will further define the policies, investigate impediments to their implementation, and prioritize them to the degree possible.

These implementation strategies include both incentives and deterrents, and range from continuing use of certain planning tools and programs through simple changes in existing programs to dramatic changes in policy or state enabling legislation. As such, while some of these actions will be easy to achieve, others present much more complex political challenges and additional financial commitments.

#### **DEVELOPMENT OF FACILITIES**

#### Establishment of Centers and Corridors

To develop transportation facilities and site specific land use recommendations, the region was divided into transportation planning corridors. These corridors extend over reasonable widths to capture parallel highway and transit routes. This method established a planning process which would be inherently intermodal in nature and which would look at transportation facilities in the context of their surrounding development. It also was intended to be fully compatible with other ISTEA and CAAA requirements; most notably the establishment of CMS study area boundaries.

**Corridors** were created by first overlaying a map of the identified DIRECTION 2020 regional, county, growth and revitalized centers with a highway and transit networks map. Spine routes were chosen based on travel volume, congestion and facility type. Parallel routes were captured in similar fashion keeping in mind the principal nature of the route as being either radial or circumferential to the Philadelphia/Camden and Trenton CBDs. Emerging radial and circumferential routes were also identified to indicate the growing importance of additional facilities. These may be related to regional growth patterns, the impact of new facilities or the effect of urban areas adjacent to the DVRPC region.

In preparing this map, it was determined that a number of locations in the region represented crucial confluences between corridors. These locations had unique land use characteristics often associated with topographic features and previous planning concepts. Center City is perhaps the definitive example of such an area. These locations also invariably corresponded to one or more identified DIRECTION 2020 development centers. As a result, separate **study areas or "centers"** were defined for these locations to properly address their particular conditions.

The centers and corridors map was subjected to considerable review prior to DVRPC adoption. During this process, the distinction had to be clearly maintained that the map was designed to indicate groups of transportation facilities and their surrounding land uses rather than travelsheds (i.e., all land uses that are tributary to particular transportation facilities). The adoption of the final corridor boundaries established the means to evaluate both the integrated roles of the various transportation facilities and the nature of surrounding land use and demographic conditions. The final map of regional corridors has been reproduced as Map No. 2 in Appendix A.

#### Preparation of Corridor Plans

Having defined the centers and corridors for consideration, teams of transportation and land use planners were selected to author what effectively became plans for individual areas. Staff members were selected based upon their familiarity with the areas in question and various resources were compiled to assist their efforts. In many instances, site visits were made to verify existing conditions.

Baseline information collected for each corridor included socio-economic data, journey-to-work data, land use characteristics, travel patterns, forecasted
trends, TIP projects, authority projects where applicable, recommendations of previous planning efforts and mapping. The planning exercise was also framed for each corridor in terms of accomplishing the regional goals and objectives through the means which best suit the area. Study teams then researched the particular issues affecting each corridor.

Building on the TIP, anticipated development trends, the aforementioned regional policies and comments received at citizen *charrettes*, staff teams developed draft recommendations for each area. These comments were reconciled across the boundaries between corridors and centers as well as in other areas where corridors overlap.

The draft Centers and Corridors plan assembled these stand-alone plans for each corridor and center showing conditions, trends, problems and land use/ transportation recommendations. Composite maps showing existing land use conditions and transportation facilities were furnished for each area. This draft was then circulated for comments from member governments and agencies as well as interested parties. Because of its voluminous nature, portions of the document were also circulated individually. The entire document was made available via electronic media. During the review process, prioritization of projects as either short term or long term was achieved based upon need and perceived acceptability.

## **PUBLIC PARTICIPATION**

An extensive public outreach effort (detailed in DIRECTION 2020 Report No.s 3, 4 & 30) was integrated with these activities. DVRPC's newly organized Public Participation Committee, which had been charged with guiding the public participation strategy, represented a number of interests, including the business community, the news media, chambers of commerce, port and rail interests, citizens, the disabled, and environmental concerns. To provide this guidance, the committee met on an ad hoc basis to recommend various public outreach programs to the DVRPC Board for implementation. This group drafted a Public Participation Initiative and Policy Statement which provides guidance for all future DVRPC public outreach efforts.

Public outreach took many forms including:

- press conferences, periodic newsletters, and meetings held in conjunction with the review of the TIP,
- a resident opinion surveyconducted by telephone, this instrument was intended to obtain statistically significant data regarding various transportation and land use policy questions,

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- a general opinion surveydistributed through newspapers and at shopping malls, this instrument was intended to solicit input into the planning process from as large an audience as possible,
- a series of five charrettes (i.e., interactive workshops) held throughout the region where detailed comments were received about two predetermined planning corridors or centers which pertained to each area,
- both policy and facilities plans were made available on the

Liberty Net computer bulletin board,

- workshop presentations at the 1993 DVRPC Board Retreat, and
- a speakers' bureau to present DIRECTION 2020 information to various groups throughout the region.

At each point where public interaction was achieved, the public was invited to participate in the ongoing work of DIRECTION 2020 through DVRPC's Regional Citizens Committee. A great deal of effort was made to insure that this body was apprised of all project work in



Chester/Delaware Charrette, August 9, 1994

progress so that their questions and comments could be addressed.

Feedback was folded back into plan development in a variety of ways. Comments regarding the candidate regional policies were entertained when developing the draft policy agenda. Similarly, the results of the Board retreat workshop and opinion surveys were presented to both the DVRPC Board and the Regional Citizens Committee prior to their review of both the draft policy and facilities plans. Also, results from the five charrettes were given to the corridor authors, who often had presided over these same sessions.

## III THE EXISTING TRANSPORTATION SYSTEM

The Delaware Valley's transportation systems are among the most comprehensive of any area in the nation. Sailing ships, followed by barge traffic, railroads, highways, and, finally, airports, have given the region a legacy of extensive transportation systems and make it ideal for economic development. Virtually all types of transportation, both public and private, are currently represented within the nine-county DVRPC area, including highways, transit, trucking, ports, rail, air freight and air passenger systems.

#### THE HIGHWAY SYSTEM

The Delaware Valley highway system is a network of limited access facilities, arterial highways, secondary collector roads and local streets, reflecting the different uses and periods of highway construction and the programs that have supported the system. Private companies built the earliest inter-regional roads and charged users a fee to "turn aside a pike" and gain entry. While these early roads have long since disappeared, their routes are still followed by modern highways. Examples include the arterial portions of US 30 (Lancaster Pike) and PA 309 (Bethlehem Pike). Following this period, building and maintaining roads was generally considered to be a public function and responsibility gradually shifted from local governments to higher levels. In 1891, New Jersey became the first state to establish a state highway department. The Federal Aid Primary system, created in 1921, established criteria for selecting

and marking routes important to interstate commerce. The first continuous coast-tocoast numbered route was US 30, running between Atlantic City, New Jersey and Astoria, Oregon, passing through Center City Philadelphia. Most of the original primary aid highways were built as arterials and, for the most part, they proved adequate to meet the needs of traffic at that time. However, by the end of the 1930s, New Jersey had begun building dualized routes, such as US 1, in order to improve safety and add capacity.

It quickly became evident that existing programs lacked the resources to build the highways that the public demanded. With east-west commerce constrained by the Appalachian Mountains, Pennsylvania established a public turnpike authority and became the first state to float a bond issue to build a new grade-separated expressway. The initial section of the Pennsylvania Turnpike opened between Irwin and Carlisle in 1940, though the Turnpike did not reach the Delaware Valley until after World War II, when it was extended eastward to Valley Forge.

Tolls imposed on users serviced the bonds and provided the means to maintain and expand the facility. Pennsylvania showed that bonds provided a practical way to finance new highways and the practice spread to neighboring states. It abated only with the passage of the Federal Aid Highway Act of 1956, which established the Interstate highway program and the federal trust fund used to pay for it.

The resulting network, composed of layers from several preceding eras, provides access to virtually every developed land parcel in the DVRPC region. These highways function as an integrated system. The earliest major roads serve to connect major urban centers with each other and major destinations outside of the region. Other older roads provide similar connections to smaller cities and boroughs. A select number of these older roads (e.g., US 202, NJ 73) have since been upgraded to reflect their growing importance as circumferential routes for intersuburan travel. Newer major highways have supplemented both radial routes (e.g., I- 76, I-95, NJ 55) and circumferential routes (e.g., I-276, I-295, I-476).

There are 6,244 miles of highway routes in the region, of which 3,895 miles are in Pennsylvania and 2,349 miles are in New Jersey. Of this total, 204 miles are interstate highways; 1,591 miles are other principal arterial routes; 2,005 miles are minor arterial routes; and 2,444 miles are collector routes. Other roads in the region are functionally classified as local roads. The major existing highway facilities are described below.

## **Limited Access Facilities**

Pennsylvania Turnpike (I-76 and I-276)	Toll road running east-west across the state of Pennsylvania, which links the Ohio and New Jersey turnpikes and serves as a partial circumferential route extending around the northern section of Philadelphia.	
Northeast Extension of the Pennsylvania Turnpike (PA 9)	Toll facility starting from the Pennsylvania Turnpike at Plymouth Meeting, provides access to Scranton, Wilkes-Barre and the Pocono Mountains resort area.	
Schuylkill Expressway (I-76)	Parallels the Schuylkill River from the Pennsylvania Turnpike at Valley Forge (King of Prussia) to the approach to the Walt Whitman Bridge over the Delaware River. In New Jersey, it continues south to connect with I-295 at the NJ 42 Freeway.	
Delaware Expressway (I-95)	Parallels the Delaware River and serves the corridor from Wilmington, Delaware to Trenton, where it terminates at I-295. Serves Philadelphia International Airport and Center City Philadelphia.	
Mid-County Expressway (l-476)	Traverses a north-south route between I-95 north of Chester and I- 276 in Plymouth Meeting, acting as a southward extension of PA 9. Serves as a bypass around Philadelphia through the western and northern suburbs.	

Vine Expressway/ North-South Freeway (I-676)	In Philadelphia, connects I-76 with I-95 immediately providing additional access points along the northern edge of Center City. A spur continues the I-676 designation across the Ben Franklin Bridge via the local street network around Franklin Square. In New Jersey, it provides a limited access connection between the approaches of the Ben Franklin and Walt Whitman Bridges with intermediate access points serving the City of Camden.	
US 422 Expressway	Connects Pottstown with US 202 at King of Prussia and serves a growing development corridor in Montgomery County.	
PA 309 Expressway	Provides a bypass of the old Bethlehem Pike. Completed sections run from Northwest Philadelphia to the Springhouse area in Montgomery County and from Souderton to near Quakertown in Bucks County.	
US 202 Expressway	North-south limited access route between West Chester in Chester County and King of Prussia in Montgomery County.	
US 202/611 Bypass	Limited access facility which bypasses Doylestown Borough in Bucks County.	
US 30 Bypass	Limited access facility which bypasses the Coatesville/Downingtown area in Chester County. A bypass of the Exton community is under construction which will link this facility with the US 202 Expressway at its present interchange with US 30.	
US 1 Freeway	North-south limited access facility in Bucks County between Philadelphia County and Trenton which bypasses old US 1 through various commercial areas. The most recent section opened to traffic in 1987.	
US 1 Media Bypass	Limited access facility to bypass the Media area between PA 352 and PA 320 in Delaware County.	
US 1	Limited access facility in Chester County south of PA Route 52 to a point between Sylmar Road and the Pennsylvania/Maryland state line.	
New Jersey Turnpike	Toll facility traversing the region north-south, providing access from the Baltimore/Washington area via the Delaware Memorial Bridge to the Newark/New York area north of Rutherford. Eight interchanges are provided along the 65 mile portion in the Delaware Valley.	
I-195	Connects I-295 in Hamilton Township with NJ 34 in the vicinity of the Garden State Parkway and various shore points.	

I-295	Parallels the New Jersey Turnpike, serving the corridor from Wilmington to Trenton. Part of the Gloucester County portion was incorporated from a preexisting alignment and remains underdesigned.
Atlantic City Expressway	East-west toll facility connecting the North-South Freeway (NJ 42) at Turnersville with Atlantic City. Limited access highway connections to other south shore resorts can be made via the Garden State Parkway interchange just west of Atlantic City.
NJ 42 Freeway	Provides a limited access connection between the I-76/I-295 interchange and the Atlantic City Expressway.
NJ 55 Freeway	Completed in 1989, extending from NJ 42 in Deptford Township to the Vineland area in Cumberland County, this facility improves access to Salem, Cumberland and Cape May counties from the region. Consequently, it also improves the highway accessibility of this developing portion of Gloucester County from the rest of the region.
NJ 90	Carries traffic between the Betsy Ross Bridge and NJ 73 in Cinnaminson.
Trenton Freeway (US 1)	Limited access bypass of old US 1 through Trenton and a portion of Bucks County, Pennsylvania.

The region's network of limited access highways does not cover all of the trunk corridors important to regional and interstate commerce. In some cases, demand does not warrant the investment in new facilities. In other cases, the shortfall of available construction funds or environmental concerns have delayed or canceled plans for new highways. Travel along these corridors is accommodated by arterial roadways.

## Arterial Facilities

An extensive network of major arterial facilities supplements the limited access highway network of this region. An

arterial highway, characterized by its use and its design, is usually the main thoroughfare between the established centers of the region. For the most part, these routes predate the limited access facilities, since many are remnants of the earlier federal-aid primary system and others are upgraded older two-lane roads between country towns. Some of the original primary highways became so heavily traveled that they have been replaced by limited access highways along the same corridor. As a result, these roads now serve a more local function, often providing access to commercial and industrial areas. Examples include US 13, which is

Moving People and Goods



paralleled by I-95 along the Pennsylvania side of the Delaware River and US 130, which is paralleled by I-295 in New Jersey.

Sometimes, older primary highways are upgraded to expressway status on a piecemeal basis. Under such circumstances, parts of the route are limited access, while other parts are typical arterial roadways. US 202, which serves as a circumferential highway through the western and northern suburbs of Philadelphia, is a good example. Once envisioned to be rebuilt over its entire length as a freeway, only portions have been (or are likely to be) converted.

Arterials provide the connections needed to fill in between limited access highways. Though many of these routes extend radially outward from the region's core of Philadelphia and Camden and, to a lesser degree, from Chester and Trenton, others accommodate circumferential travel.



#### Collector Roads and Local Streets

Collector roads provide the links between local streets and the arterial and limited access highways. In Pennsylvania, these routes are generally unnumbered. In New Jersey, collectors usually carry secondary route numbers and are under the control of the counties. However, many of these secondary routes are more properly classified as arterials.

#### The Combined System

The figure on the previous page depicts the number of combined state and local route miles and toll mileages for each of the DVRPC counties. Additionally, the table below indicates the number of state and local bridges, excluding those on toll

routes. As can be seen from this information, the Pennsylvania non-toll infrastructure is more developed, with 1.94 times the number of route miles. Pennsylvania also has 7.28 times the number of state and local bridges excluding toll routes. The large bridge differential can be partially attributed to the effects of terrain on development and partially to the proliferation of rail corridors in coexistence with the street network. Both states have considerable lengths of toll roads within the region in predominantly rural and suburban areas that provide valuable intercity connections. Some of these routes also serve significant numbers of automobile and transit commuters.

Number of	County	Number of	County
Druges	County	Diluges	County
610	Bucks	157	Burlington
630	Chester	49	Camden
417	Delaware	85	Gloucester
697	Montgomery	119	Mercer
701	Philadelphia		
3,055	PA TOTAL	410	NJ TOTAL

## PA and NJ Highway Bridges<sup>1</sup>

<sup>1</sup>Existing state and local mileage, bridges with spans>20'. This data is furnished by state DOTs. Data is dated April 20, 1995. This data excludes toll authority mileage.

## Highway Bridges Linking Pennsylvania and New Jersey

There are 18 bridges in the region spanning the Delaware River and connecting Pennsylvania with New Jersey, comprising a significant element of the highway network. North of the Trenton area, eight highway bridges connect roads in Bucks County to Mercer and Hunterdon counties, New Jersey. Most of the bridges are minor and are not generally intended for a high volume of commercial traffic. The major bridges in this section are the US 202 toll bridge just north of New Hope and the Scudder Falls (I-95) bridge, which has no toll. Two bridges link local streets at Trenton.

From Trenton to the Delaware border, there are eight major bridges linking Pennsylvania and New Jersey, all of which are toll facilities. They include:

- US 1 Freeway
- Delaware River Turnpike Bridge (I-276)
- Burlington-Bristol (PA 413/County 541)
- Tacony-Palmyra (PA/NJ 73)
- Betsy Ross (NJ 90)
- Benjamin Franklin (I-676, US 30)
- Walt Whitman (I-76)
- Commodore Barry (US 322)

The US 202 bridge is owned and operated by the Joint Toll Bridge Commission. The Burlington-Bristol and Tacony-Palmyra bridges are operated by the Burlington County Bridge Commission and the Turnpike Bridge is operated jointly by the Turnpike Commissions of New Jersey and Pennsylvania. The Betsy Ross, Benjamin Franklin, Walt Whitman and Commodore Barry bridges are operated by the Delaware River Port Authority (DRPA). The toll on the DRPA bridges is currently \$2.00 for non-commercial vehicles. Tolls are collected only on the westbound trip.

South of the DVRPC region, an additional Delaware River crossing carries I-295 between I-95 & I-495 south of Wilmington and the New Jersey Turnpike in Salem County. These twin bridges are operated by the Delaware River & Bay Authority, which also operates the Cape May-Lewes Ferry service.

#### THE TRANSIT SYSTEM

Transit service in the Delaware Valley is provided by various agencies and private carriers. The Southeastern Pennsylvania Transportation Authority (SEPTA) operates public transportation in the Pennsylvania counties, maintaining one of the most diverse transit systems in the nation. SEPTA bus and rail lines extend into the City of Trenton and regional rail service is also provided to West Trenton, New Jersey and Claymont and Wilmington in Delaware. SEPTA service is augmented in the Pottstown area with local bus service provided by Pottstown Urban Transit (PUT).

NJ TRANSIT Corporation (NJ TRANSIT) provides bus service for Burlington, Camden, Gloucester and Mercer counties, with additional direct service to Philadelphia and various shore destinations. NJ TRANSIT also provides commuter rail services between Philadelphia and Atlantic City, and between Trenton, Princeton and New York. Additional heavy rail transit service is provided between Center City Philadelphia and Lindenwold in Camden County by the Port Authority Transit Corporation (PATCO), which is a subsidiary agency of the Delaware River Port Authority.

## The Southeastern Pennsylvania Transportation Authority (SEPTA)

The Southeastern Pennsylvania Transportation Authority provides almost all rail and public transit services within the Pennsylvania side of the region. SEPTA was created in 1964 to consolidate the routes of several failed, private transit operators. Financial support for current operating expenses is provided by the City of Philadelphia and four suburban counties (Bucks, Chester, Delaware and Montgomery), as well as state and federal subsidies. There are three operating divisions within SEPTA, which offer different types of services in different areas of the region.

#### City Transit Division

The City Transit Division is the largest of the groups and provides numerous types of transit services. Two heavy rail transit lines, the Market-Frankford Subway/Elevated and the Broad Street Subway, serve as the foundation of this division's services. They are supplemented by five subway-surface light rail, five trackless trolley and 73 bus routes, which together handle 590,000 linked trips on an average weekday.<sup>2</sup>

• The Market-Frankford Line carried approximately 191,000 average weekday trips in 1994 and is the most heavily used line in the entire SEPTA system. The line follows an L-shaped route, running east along Market Street from 69th Street in Upper Darby Township through Center City to the Delaware River waterfront, where it turns northward to follow Front Street, Kensington Avenue and Frankford Avenue to its terminus between Bridge and Pratt streets. Service is provided by a fleet of 250 Budd cars, which, although reliable, are noisy and lack air conditioning. These cars are presently scheduled to be replaced by new vehicles by October 1997.<sup>3</sup>

The Center City portion between 40th and 2nd streets operates as a subway and the rest of the route runs on an elevated structure completed in 1922. The western terminus at 69th Street serves as a major transfer point to other rail and bus routes, and handles a significant number of Delaware and Montgomery County commuters. The northeastern terminus provides an important transfer point for travelers to Northeast Philadelphia and adjacent Bucks County, although several other stations on the Frankford end also handle significant numbers of transfer passengers. At the Frankford end, the entire elevated structure is being renovated, while under operation, in the largest reconstruction project in SEPTA's history.

• The Broad Street Subway is a northsouth line running underground between Fern Rock station and Pattison Street via City Hall, where passengers may transfer for free to the east-west Market-Frankford Line. The line carried roughly 134,000 average weekday trips in 1994. Philadelphia's sports complex is located adjacent to the Pattison Avenue station. A spur under Ridge Avenue provides a direct connection to Eighth & Market streets from Fern Rock. Many of the stations have been recently refurbished. Service is provided by a fleet of 125 air-conditioned cars acquired from Kawasaki in 1983. In

<sup>3</sup>SEPTA NEWS, Fall 1994, Southeastern Pennsylvania Transportation Authority, p.1.

<sup>&</sup>lt;sup>2</sup>SEPTA Ridership and Statistics Report, Fiscal Year 1994, Southeastern Pennsylvania Transportation Authority, Philadelphia, PA, 1994, p. 21.

1991, express tracks were extended northward from Erie to Olney Avenue.

• Subway-Surface Light Rail Service is currently offered on five regularly scheduled routes, all in West Philadelphia. The lines operate on the street west of 40th or 36th Streets and underground east to 13th Street in Center City. The Subway-Surface fleet currently consists of 112 air-conditioned Kawasaki cars purchased in 1983. One other line, the Chestnut Hill Trolley, operates only on weekends along the northern portion of Germantown Avenue in the Chestnut Hill and Mount Airy communities. This route is served by 1940's vintage rolling stock.

• Trackless Trolley Service (electric bus service) is operated by SEPTA on five routes; three act as feeders to the Market-Frankford line in Northeast Philadelphia, emanating from the Frankford and Margaret-Orthodox stations. The remaining two provide feeder service to the Broad Street Subway in South Philadelphia at the Snyder Avenue and Morris/Tasker Street stations.

• **Bus Routes**—The City Transit Division operates diesel buses, which carry about 52 percent of the division's riders.<sup>4</sup> Several routes go beyond the city limits into areas of Bucks, Montgomery and Delaware counties. Due to an aggressive program of bus replacement, the average age of the SEPTA bus fleet is roughly 10.5 years.

• **Maintenance Facilities**—Within the City Division, there are currently seven

bus and light rail maintenance facilities. With the exception of two new facilities, one at 26th Street and Allegheny Avenue, the other at Island and Elmwood Avenues, most of these facilities are quite old and outdated. Consequently, maintenance is more expensive than it would be at modern facilities. The number of facilities is also insufficient to adequately handle all of SEPTA's rolling stock.

#### Regional Rail Division

In FY 1993, the Regional Rail Division operated commuter trains on a total route length of 264 miles and carried an average of 90,000 trips per weekday.<sup>5</sup> SEPTA's Regional Rail lines include:

• **R1:** Service between Warminster and Philadelphia International Airport

• **R2:** Service between Wilmington/ Marcus Hook and Center City Philadelphia; service between Center City Philadelphia and Warminster

• **R3**: Service between Elwyn and Center City Philadelphia; service between Center City Philadelphia and West Trenton

• **R5:** Service between Parkesburg/Paoli and Center City Philadelphia; service between Center City Philadelphia and Lansdale/Doylestown

• **R6:** Service between Norristown and Center City Philadelphia; service between Center City Philadelphia and Cynwyd

<sup>&</sup>lt;sup>5</sup>Statement of Louis J. Gambaccini, General Manager of SEPTA, on the proposed DVRPC Year 2020 Plan (dated 6/29/95), p.5.

<sup>&</sup>lt;sup>4</sup>Ibid., p. 22

• **R7:** Service between Trenton and Center City Philadelphia; service between Center City Philadelphia and Chestnut Hill East

• **R8:** Service between Chestnut Hill West and Center City Philadelphia; service between Fox Chase and Center City Philadelphia.

Commuter rail service in the Southeastern Pennsylvania area was originally offered by the Pennsylvania and Reading Railroads. The Pennsylvania Railroad commuter trains served the Main Line, the county seats of Norristown, West Chester and Media, the Delaware River corridor into Marcus Hook, the Chestnut Hill area, and Trenton. The Reading also operated into Chestnut Hill, Norristown and Trenton, as well as other communities north of Philadelphia, including the county seat of Doylestown.

Both companies had extensive route networks that together fanned out in all directions on the Pennsylvania side of the Delaware River. Most routes were electrified as electric traction was required for entry into the Pennsylvania's Suburban Station. The Reading operated some diesel trains into Reading Terminal.

In New Jersey, the two railroads created a joint venture called the Pennsylvania-Reading Seashore Lines which provided both freight and passenger service. Passenger service generally emanated from Camden to outlying cities and boroughs Additional lines ran between Philadelphia and various shore destinations via Lindenwold. In Camden, passengers transferred to either a river ferry or a light rail line which ran across the Ben Franklin Bridge. When the PATCO line opened in 1969, service on parallel commuter rail lines ended.

When Conrail was formed in 1976, from the remains of the Penn Central, Reading and four other bankrupt railroads, it took over operation of the remaining commuter lines, which were by then functioning with public subsidies. Service on most of the non-electrified lines ended in 1981.

In 1983, SEPTA took over direct operation of the Pennsylvania trains and became owner of most of the track and structures over which they run. Principal exceptions are the Northeast Corridor, the Harrisburg Main Line and the West Trenton Line north of Neshaminy Junction. The first two lines had earlier passed to AMTRAK upon the formation of Conrail. The latter is part of Conrail's main freight line between Philadelphia and Newark, New Jersey.

Though the overall route mileage had shrunk somewhat from earlier years, SEPTA first continued to operate the old Penn Central and Reading systems separately. A major change to this practice occurred late in 1984 when the Center City Commuter Tunnel opened, connecting the two separate rail systems. Reading routes were paired with Pennsylvania routes and schedules were rewritten to allow through operation from one side to the other. Riders are able to reach any of the three Center City terminals, regardless of the route from which their trip originated.

The construction of a new passenger line to Philadelphia International Airport was the second major capital project completed in recent years. It significantly expanded the utility of the rail system, enabling passengers to transfer to the Airport line from any other regional rail line. Although the route took advantage of existing track for much of the way, the track had to be upgraded to passenger standards and supplied with overhead power for electric traction.

#### Suburban Transit Division

The Suburban Transit Division is composed of the Victory and Frontier Districts. Each of these districts has its own routes, garages and labor contracts.

• The Victory (formerly Red Arrow) District operates eighteen bus routes, fourteen out of its principal terminus at 69th Street in Upper Darby Township. Other bus routes focus on the Darby Terminal with its light rail connections to West Philadelphia and City Hall, and the City of Chester.

There are also three rail lines operating out of 69th Street. Two of them are light rail lines (Sharon Hill and Media). The third rail route possesses some rather unique characteristics. Route 100, commonly referred to as the "Norristown High Speed Line", runs for almost 14 miles through suburbs to the Norristown Transportation Center. It is fully grade separated with third rail electrification. Yet, it provides a light rail form of service with frequent, single car service, on board fare collection and station stops by request. The rolling stock on this line was upgraded during 1993 and 1994, providing a more comfortable, air-conditioned ride.

• The Frontier District provides 13 bus routes to selected outlying portions of the region. Six routes extend SEPTA's service north and west from the Norristown Transportation Center. Additional routes connect King of Prussia with West Chester, and Chestnut Hill with Lansdale. Other routes originate at the Oxford Valley Mall and serve lower Bucks County and the Trenton area.

Early in 1988 in response to employer requests for transit service to their sites, SEPTA created a new class of suburban service-feeder bus routes designed to connect office centers and industrial parks with nearby regional rail stations. These routes, called the "200 Series", are scheduled to pulse with train arrivals at the Fort Washington, Willow Grove, Warminster, Paoli and Lansdale stations, and to offer lower fares for transfer passengers. Six routes were established, financed in part by employer subsidies. However, patronage remains light and one route, originating from the Pennbrook Station in the Lansdale area, was discontinued. An additional route between Wayne Station and King of Prussia, operates only on Saturdays.

## NJ TRANSIT Corporation

The NJ TRANSIT Corporation is one of two principal transit service providers in the South Jersey portion of the region and provides transit service across the Delaware River between New Jersey and Philadelphia. There are three Divisions, each providing service to separate regions of the state.

#### Southern Division

Bus operations in South Jersey consist of 35 regular and seasonal bus routes, 16 of which provide service to Philadelphia from Camden, Burlington and Gloucester counties. These routes carried 66 percent of the ridership for NJ TRANSIT's Southern Division. Local intrastate service is provided on 10 routes, carrying 21 percent of the ridership. While these latter routes focus mainly on Camden County, some extend into Burlington and Gloucester counties.<sup>6</sup>

Bus service to shore points from the DVRPC region is provided by nine regular and seasonal bus routes, four of which terminate in Atlantic City. Trips between Philadelphia and seashore points originate and terminate at the Greyhound Terminal located at Tenth and Filbert streets in Philadelphia. Seashore service represents 13 percent of the ridership in the Southern Division.

Seventeen routes are served by conventional transit buses with rear exit doors on which the payment of exact fare is required. The remaining 18 routes are served by intercity passenger buses which have single doors at the front of the bus and drivers provide change on these routes.

Although the infrastructure, fixed facilities and rolling stock of NJ TRANSIT's Southern Division currently remain in adequate condition, steps are being taken to improve the existing service. One of the major initiatives is the replacement of 37

84 buses in the existing fleet of 318. These replacement buses are a combination of transit and intercity passenger style buses. Intercity style buses serve the New Jersey shore routes and some of the Philadelphia oriented routes.

In 1989, a new transportation center opened in downtown Camden on Broadway to provide off-street parking and station facilities for both NJ TRANSIT bus lines and the PATCO rail transit line to Philadelphia. Except for some express commuter routes running on I-676, all bus routes passing through Camden stop at the transportation center. Another important addition to NJ TRANSIT's infrastructure is the \$17 million Washington Township Maintenance Facility in Gloucester County, which was completed in July 1988. The subsequent Newton Avenue Garage Building in Camden City houses the administrative offices for the Southern Division, in addition to providing bus maintenance.

## NJ TRANSIT Mercer

NJ TRANSIT Mercer provides 11 regular bus routes within and between Trenton and Mercer County, with some service extending to Hunterdon County. Many of the bus routes originate outside of Trenton and provide local service into downtown Trenton, where transfers can be made, then continue outbound to other suburban communities. NJ TRANSIT has also contracted with Mayflower Contract Services to provide express shuttle service along the US 1 corridor between Ewing and Plainsboro in Middlesex County. The actual route of the service in the Ewing area will vary based upon customer reservations.

<sup>&</sup>lt;sup>6</sup>Source: NJ TRANSIT

#### Rail Division

NJ TRANSIT operates 12 weekday round trips and extra service on weekends between Atlantic City and Lindenwold. Nine of the weekday round trips terminate at 30th Street Station in Philadelphia and the others at the new Cherry Hill Station. Within the region, intermediate stops are made at Garden State Park in Cherry Hill, the PATCO High Speed line Station in Lindenwold and Atco Station on NJ 73. A joint ticketing agreement exists between NJ TRANSIT and AMTRAK for connecting services at 30th Street Station.

Along the Northeast Corridor, NJ TRANSIT rail carries passengers between Trenton, Princeton Junction, Newark Penn Station (with connections to other NJ TRANSIT rail lines and PATH trains) and New York Penn Station. A shuttle operates off the Northeast Corridor between Princeton Junction and Princeton.

## Port Authority Transit Corporation (PATCO)

The Port Authority Transit Corporation currently provides regularly scheduled heavy rail service to Camden County. The 14.2-mile line was constructed during 1966-69 by PATCO's parent organization, the Delaware River Port Authority, using its own financial resources. Costs were minimized by connecting an existing rail line to a reconstructed transit line over the Benjamin Franklin Bridge.



#### PATCO High Speed Line

This line provides rail service 24 hours a day, seven days a week between Lindenwold in New Jersey and 16th and Locust Streets in Philadelphia. There are seven stations in suburban Camden County, all of which are adjacent to parkand-ride lots. The line also has four subway stations in Center City Philadelphia and two in the City of Camden, all providing convenient pedestrian access to commercial and employment areas. The Camden Transportation Center provides transfer connections to buses, as well as access to Cooper Hospital and the adjacent portions of the central business district. The City Hall station at Fifth and Market Streets in Camden provides access to the Camden campus of Rutgers University.

## AMTRAK

AMTRAK operates intercity rail service from Philadelphia's 30th Street and North Philadelphia Stations as well as Princeton Junction and Trenton Stations in New



Jersey. Frequent service is offered along the Northeast Corridor between Washington, DC and New York City. AMTRAK also schedules regular service between New York, Pittsburgh and Chicago via the Harrisburg rail line with additional, state supported service provided between Philadelphia and Harrisburg. AMTRAK service interfaces with regional rail service at Ardmore, Paoli, 30th Street, North Philadelphia, Trenton and Princeton Junction Stations. AMTRAK and SEPTA both serve Harrisburg line stations west of Paoli.

## Pottstown Urban Transit

PUT serves the western portion of Montgomery County and northern Chester County. The current system consists of four bus routes offering daily service to the Borough of Pottstown and its surrounding communities. Service is provided by a fleet of eight regular buses with additional paratransit vans. PUT is operated and maintained by a private company on behalf of the Borough. In fiscal year 1994, PUT served over 250,000 riders. With the expansion of service in Chester County in October of 1994, PUT now has over 11 miles of bus routes to serve Chester County residents.<sup>7</sup>

## AVIATION

Aviation planning for the Delaware Valley is conducted for a 12 county Aviation System Planning Region. This region includes all of the DVRPC region as well

as Salem County, New Jersey, New Castle County, Delaware and Cecil County, Maryland. The facilities in this region are comprised of five classes: general aviation (small business and recreational), business aviation (corporate, charter and courier), commercial (passenger airline), military and air cargo. Currently, there are a total of three commercial airports, 12 reliever airports, 10 general aviation airports, four heliports and three military airports in the DVRPC region. The major facility for aviation within this region is Philadelphia International Airport (PHL), located partially within the City of Philadelphia and partially in Delaware County. PHL handles roughly 400,000 flights per year. Most of PHL's flights are commercial in nature with an annual 15 million passengers. An additional 400,000 of the region's two million flights per year are handled at the military bases.

#### FREIGHT MOVEMENT

The Delaware Valley region possesses an extensive array of transportation facilities devoted to the movement of goods. Furthermore, services available in the region are diverse, with carriers handling a wide variety of cargoes serving numerous markets. Freight movement in the region can be organized into four basic categories: truck operations, rail freight, port facilities, and air freight. Many goods are transported within the region by more than one mode to their final destination. Thus "intermodal" connection points, where the various modes converge, are very important and have a significant impact on overall freight operations.

<sup>&</sup>lt;sup>7</sup>Source: Pottstown Urban Transit

## Truck Operations

Trucking operations in the region are quite varied. There are a large number of forhire carriers (from local operations to national trucking firms), as well as shippers with their own vehicle fleets.

Both Pennsylvania and New Jersey have demarcated routes for larger trucks (53' long, 102" wide, and twin trailers). Operation of these vehicles on deviations from these routes, or operation of larger vehicles, requires a special permit issued by the state or the City of Philadelphia, as appropriate. The large truck network includes all interstates, many arterial routes, and other roads that serve important truck destinations, such as port facilities.

#### Rail Freight

The region's rail freight network includes three Class I (Large) rail freight operators. The Class I rail lines are: CSX, Conrail, and CP Rail. The region represents a northern terminus for the CSX system, a southern terminus for CP Rail, and an eastern terminus for Conrail. All three railroads enjoy access to the port facilities in South Philadelphia.

Among the most prominent rail intermodal facilities in the region are: CSX's facility at Snyder Avenue in Philadelphia, CSX's Twin Oaks Auto Facility, Philadelphia Regional Port Authority (PRPA)'s Pier 98 Annex, Conrail's Morrisville facility in Bucks County, and DRPA's Ameriport facility in Philadelphia. Daily trains from these facilities serve the Midwest and Canada. The facilities handle domestic and international cargoes principally in containers and trailers.

Several smaller railroad operations (i.e., shortlines) in the region provide "door-todoor" services to shippers. These shortline operators include: the Brandywine Valley, Delaware Valley, Upper Merion and Plymouth, Blue Mountain and Reading, New Hope and Ivyland, and Southern Railroad of New Jersey.

In 1995, double-stack container train service was initiated in the region. Following a unique private/public initiative, sponsored by the affected railroads and Pennsylvania, rail clearances were raised to approximately 21 feet at more than 130 locations throughout the state to permit the passage of doublestacked containers. This project was intended to assure the competitiveness of the ports in trying to attract and retain international waterborne commerce.

## **Port Facilities**

Located 90 miles from the Atlantic Ocean, the Delaware River terminals in the region form the largest freshwater shipping complex in the world. The ports of Philadelphia handle the largest volume of international tonnage on the East Coast. Much of this tonnage is imported crude oil. Other notable imported cargoes are fruit, cocoa beans, paper products, meat, and steel. Export cargoes include scrap metal, petroleum products, chemicals, vehicles, and pulp.

Port facilities are found on both sides of the river. Principal general cargo facilities in New Jersey include the Beckett Street Terminal, Broadway Terminal, Crowley Marine Terminal at Petty's Island, and Holt Cargo. Pennsylvania facilities include the Packer Avenue Marine Terminal, Penn Terminals, Atlantic Marine Terminals, Pier 78-80, Pier 84, Pier 96 and the Tioga Marine Terminals.

One of the most significant freight system improvements under consideration by local port interests is called FastShip Atlantic. FastShip Atlantic is a novel ship design and logistics concept to convey trans-Atlantic cargo at speeds roughly twice as fast as traditional cargo ships. Vessels will gain their increased speeds through the utilization of marinized jet engines and modified hull design, and will be smaller than traditional cargo ships. The overall FastShip concept is a door-to-door logistics system designed to facilitate improved inventory and management control for shippers. The DRPA has entered into an agreement with FastShip Atlantic, whereby the DRPA will construct a high-technology terminal facility dedicated to FastShip Atlantic in exchange for the Port of Philadelphia and Camden's status as the East Coast exclusive port of call for FastShip for the next 20 years. The study phase of the FastShip project has been funded in part by DRPA, with some private backing as well. The FastShip terminal is proposed to be located at the Philadelphia Naval Ship Yard (PNSY).

Unification of bi-state port operations, long under discussion, has recently intensified. The DRPA, through Amended Compact Legislation in 1992, was charged with the role of port unification. To fulfill this objective, the DRPA created the Port of Philadelphia and Camden, Inc. (PPC), which is a subsidiary of the DRPA with its own Board. The PPC is intended to unify all public port management functions under a single organization. As originally envisioned, staff from the DRPA's World Trade Division, the Philadelphia Regional Port Authority (PRPA) and South Jersey Port Corporation (SJPC) will be merged into the PPC. Unification is underway; the DRPA World Trade Division is now under the auspices of the PPC, and the the PRPA and SJPC are expected to become part of the PPC in the near future.

#### Air Freight

Philadelphia International Airport (PHL) is currently ranked fifteenth in the nation for cargo tonnage handled. Cargo at PHL is predominantly handled through a separate terminal, Cargo City, at the western end of the main runway with 339,000 square feet of working space. Federal Express and the U.S. Post Office are two of the major shippers located there. United Parcel Service maintains its own separate cargo terminal. Access to Philadelphia International Airport is excellent; it is located on I-95 and is easily reached from all of the area's major highways.

#### **BICYCLE AND PEDESTRIAN FACILITIES**

Bicycling within the region shows a strong recreational orientation. Although more than 200 miles of existing bicycle facilities exist, the existing system is primarily recreational. Many of these facilities are trails located within parks and do not provide easy access to employment centers, town centers or transit stations. Consequently, it is not surprising that less than one percent of the region's workers bicycled to work in 1990. Recent efforts have been made to address some of these access issues. One noteable element is bike-on-rail. SEPTA's Bike-on-Rail policy permits access to various non-peak hour Regional Rail, Market-Frankford Line and Broad Street Line trains by passengers with bicycles. Bicycles are stored in train areas set aside to accommodate wheelchairs when not required for handicapped patrons. NJ TRANSIT and PATCO also have similar policies for their rail lines.

A Proposed Southeastern Pennsylvania Bicycle Network has been developed using the existing bicycle facilities as a foundation. The proposed network is the result of a collaborative effort among county planners, PennDOT, bicycle clubs, and the general public. The goal of the network is to provide options to and reduce dependency on the automobile. Consequently, the factors that were considered in adding a route to the network include: density of a community; proximity to large employers, transit, and schools and universities; and location of existing bicycle facilities.

In addition, several communities throughout the region have outlined transportation oriented bicycle plans within their master plans. In many cases, not only do these bicycle plans connect with existing facilities in a community, but they also provide transportation to key community destinations.

Philadelphia has a well recognized reputation for being a pedestrian friendly city. This is particularly true of the Center City area with its network of side streets and alleys. Relatively compact development forms in Philadelphia and other older communities also are conducive to pedestrian travel. This is not true of newer communities, however. Widely separated land uses, lack of sidewalks and other amenities, and high vehicular travel make walk trips largely impractical.

## IV HISTORICAL TRENDS

#### **REGIONAL GROWTH CHARACTERISTICS**

#### Population

The population of the Delaware Valley region is increasing slowly, reflecting the continuing vitality of the metropolitan area. In 1990, the U.S. Census reported population for the DVRPC region was 5,182,705, a 3.2% increase over 1980. With the exception of a slight downturn between 1970 and 1980, the region has exhibited a continuous post-World War II growth in population. This trend, coupled with the growth in trip making associated with an increasingly mobile society, helps insure a rising overall demand for transportation systems and services in the region.

The largest contributor to the increasing mobility of the population nationwide has been the personal automobile. The automobile has minimized the advantages of proximity to public transportation systems. Because of the highly concentrated development form and





extensive transit network in this region, the local impacts of these trends have been both prolonged and dramatic. This is best evidenced when comparing demographic information for the City of Philadelphia with the surrounding counties.

The population of the City of Philadelphia peaked with the 1950 census at 2,072,000, and has been declining since. The 1950 census also marks a point at which population increases in both the Pennsylvania and New Jersey suburbs began to accelerate significantly. The cities of Camden and Trenton experienced the same pattern of out-migration.

## Employment

Similarly, employment in the Delaware Valley has been steadily rising over a period of years despite changes in the national economic climate such as the decline of some sectors of the economy. In 1990, the U.S. Census reported 2,694,000 employed persons for the DVRPC region, an 18% increase over 1980. These figures are reproduced from DIRECTION 2020 Report #15: Year 2020 Municipal Forecasts of Occupied Housing



# Units, Vehicle Availability and Employed Residents which details the sources used.

The City of Philadelphia has lost substantial employment during the period 1970 to 1990, while the surrounding counties have markedly increased their employment bases. There are a variety of reasons for this trend. Most significantly, manufacturing jobs in the city have declined. These job losses have been offset by job increases in the suburban counties, but most have generally been lower-paying service jobs. This redistribution of employers to the suburbs has a threefold impact on the transportation system. First, since the existing freight rail network was largely built to serve the industrial centers of Philadelphia, Camden and Trenton, the trend increases reliance on the highway network for the shipment of goods while discouraging the use of the rail. Second, it expands the area subject to suburban sprawl development by reducing the hometo-work travel time from points at the periphery of the region. Third, it redistributes home-to-work travel patterns





which had previously been oriented toward the region's urban centers. This makes the anticipation of long-term travel patterns more difficult to understand and collective improvement of individual home-to-work travel conditions more difficult to undertake.

## **Commuting Patterns**

As a result of the combined impacts of decentralization of the population base within the region and the suburbanization of employment, the region has become far more automobile dependent for work trips. Even residents of Philadelphia, which remains densely populated and well served by transit, now primarily travel to work by automobile. Since fixed route transit services are poorly suited to serving widely dispersed residences and job sites, the proportion of work trips by transit has declined. Considering the extensive nature of the transit services that are provided in the region, this loss of ridership represents a growing diseconomy within the transportation system. As the transit providers struggle to maintain their existing systems, a portion of the lost revenue from lost ridership is passed on to the remaining riders through fare increases or increases in government subsidies. Fare increases serve to accentuate this trend by further discouraging transit ridership. The graph on Auto Dependency illustrates that the rate of change in percentages of work trips by auto and transit modes has been relatively uniform across the entire region. In Philadelphia, these percentages have largely stabilized because of the lower rate of automobile ownership. It should also be noted that these long-term changes occurred independently of external factors such as the 1973 oil embargo, periodic transit strikes, highway openings and reconstructions. Moreover, the similar conditions in the Pennsylvania and New Jersey suburbs indicate that these trends were also somewhat independent of the nature of the fixed route transit service provided. Rather, these trends mirror the changing demographic patterns of the region and how the demand for transportation systems and services changes as a result.

Pedestrian work trips have been a declining percentage of total work trips in both New Jersey and the suburban Pennsylvania counties. (The dramatic loss—41%—of pedestrian work trips in New Jersey between 1960 and 1980 can largely be attributed to reductions in staffing at the Burlington County military installations.) At the same time, the percentage of pedestrian work trips for the City of Philadelphia has slightly increased.

Between 1960 and 1980, the number of workers who worked from their homes declined by 47%, although the absolute number is relatively small. Part of this

decline in the outlying portions of the region may be a function of a general shift away from agricultural employment. This trend reversed itself in the last decade as the number of people working from home increased by 70% over the 1980 total. New technologies which allow a greater variety of work to be accomplished away from collective work sites have led to a growing segment of the workforce which "telecommutes". In addition, the changing economy has also led to an increase in self-employment which has become particularly beneficial to double-income households.

## **CURRENT USAGE LEVELS**

## Highway Usage

A wide variety of travel patterns is accommodated by the highway system in the DVRPC region. The following tables on *Highest Daily Traffic Volumes* inventory the ten most used facilities for the Pennsylvania and New Jersey portions of the region. Listed with each facility is the portion (exclusive of the Delaware River crossings) which exhibited the highest average daily traffic (ADT) in 1993. The segment of each listed highway with the highest volume is shown.

A great deal of the travel occurs on the higher-design facilities. The four most used facilities in New Jersey and the ten most used facilities in Pennsylvania are all limited access highways. Moreover, the segments cited for the fifth and sixth highest facilities in New Jersey (NJ 73 and US 1) serve as a convenient connection between limited access routes. The region's major routes serve one or more of three possible roles. They may serve as radial routes for the wellestablished centers of commerce and employment in the region. These routes (such as I-95, I-76, NJ 42 and US 422) follow more or less traditional corridors of movement and connect these centers to major destinations outside the region. Other corridors (such as I-276, I-476 and I-295) are circumferential routes around these urban centers which serve to connect other destinations as well. The highest volume segments of these facilities are usually associated with the highest volume connecting facilities. Still other corridors are spurs intended to connect communities with the higher-design facilities. Although the route designations of these corridors may continue for significant distances, a higher percentage of the trips on these facilities will either originate or end in the adjacent communities. Such corridors include Woodhaven Road (PA 63) and Bethlehem Pike (PA 309).

## Transit Usage

Of the region's public transit systems, the SEPTA fixed rail service is the most

ELUCTOR IN 1999	Highway	From-	To—	1993 AADT
1	I-95	Allegheny	Girard	151,100
2	I-76	Girard	Belmont	145,500
3	I-676	I-76	22nd Street	117,700
4	US 1 Expressway	Ridge	Fox	112,800
5	US 202	US 422	I-76	89,000
6	I-276	Northeast Extension	Fort Washington	83,100
7	I-476	I-76	Ridge	83,000
8	US 422	PA 363	PA 23	66,400
9	PA 63	US 13	Knights	55,900
10	PA 309	Penn	Church	55,500

#### Ten Highest Traffic Volumes in Pennsylvania portion of Region

#### Ten Highest Traffic Volumes in New Jersey portion of Region

Highway		From—	To—	1993 AADT	
1	1-76	I-295	US 130	165,500	
2	NJ 42	CR 544	NJ 55	100,300	
3	New Jersey Turnpike	l-195	Hightstown	93,100	
4	I-295	CR 561	NJ 70	88,200	
5	NJ 73	NJ Turnpike	I-295	84,000	
6	US 1	I-295	Lawrence	71,200	
7	US 130	NJ 73	CR 616	63,400	
8	NJ 70	NJ 41	I-295	54,300	
9	NJ 38	Cuthbert	CR 616	53,600	
10	I-676	I-76	Morgan	52,600	
Property	Service	Line/Route Miles	Vehicles Available	Stations	Unlinked Trips/year
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NJ TRANSIT	Commuter Rail	112	172	7	566,000
	Bus	1,291	260	0	11,816,000
PATCO	Fixed Rail	14	121	13	11,151,000
Pottstown	Bus	35	8	0	254,000
SEPTA	Fixed Rail	39	369	75	81,372,000
	Commuter Rail	282	347	155	21,238,000
	Light Rail	80	230	57	28,379,000
	Trackless	21	110	0	10,644,000
	Bus	1,377	1,441	0	156,994,000
TOTAL		3,251	3,058	307	322,414,000

**Fixed Route Transit System Characteristics** 

heavily patronized, whether considering unlinked trips per vehicle available or unlinked trips per one-way mile. The lines are well established and serve some of the oldest, most densely developed sections of Philadelphia with a high frequency of service on dedicated right-ofway. The PATCO line into New Jersey is similarly well-patronized. The chief distinction between PATCO and SEPTA fixed rail service is that the development density along the PATCO line is not as great.

The tables on *Fixed Rail Station Usage* furnish turnstile counts for the ten most frequently used stations for both of SEPTA's fixed rail lines (the Market-Frankford and Broad Street lines) and the PATCO line. City Hall Station, a heavily used interchange between the MarketFrankford Line and the Broad Street Line does not appear in the table because transferring patrons do not pass through a turnstile. Thus, turnstile counts for that location do not represent the station's total usage.

The Market-Frankford line has the heaviest volume station and seven of the top ten. This excludes the free interchange transfers between this line and the Subway-Surface Light Rail Stations at 13th, 15th and 30th Street stations and with the Broad Street line's City Hall Station. The 15th & 16th Street platforms are closest to the most densely developed portion of Center City Philadelphia and afford an interchange point with Suburban Station, the most heavily utilized commuter rail station. The remaining top four stations on the Market-Frankford line

#### Moving People and Goods

Fixed	Rail	Station	Use*

SEP	TA Market-Frankford Line	Avg. Weekday
1	15th Street	25,600
2	Bridge-Pratt	14,900
3	69th Street	11,800
4	8th Street	11,600
5	11th Street	8,200
6	52nd Street	8,200
7	13th Street	6,000
8	30th Street	5,500
9	60th Street	5,300
10	56th Street	4,600
SEP	TA Broad Street Line	Avg. Weekday
1	Olney	19,500
2	Columbia	6,800
3	Walnut-Locust	6,000
4	Fern Rock	5,800
5	Erie	5,500
6	Spring Garden	5,300
7	North Philadelphia	4,300
8	Girard	4,000
9	Allegheny	3,800
10	Snyder	3,600
PAT	CO Lindenwold Line	Avg. Weekday
1	16th and Locust	7,900
2	8th and Market	6,200
3	Lindenwold	5,500
4	Woodcrest	3,100
5	Ferry Avenue	2,900
6	Ashland	2,500
7	Broadway	2,100
8	Haddonfield	2,100
9	Collingswood	1,700
10	I STN AND LOCUST	1,700

\*FY 1994 Turnstile Counts

are all transfer points to other significant lines in the SEPTA system. The fourth highest location, 8th & Market Streets, is convenient to the Market East/Gallery shopping complex and affords a transfer location to both the PATCO line and the

	Station	Line(s)	Board & Alight/Day
1	Suburban	All	18,900
2	Market East	All	8,400
3	30th Street	All	5,900
4	JenkintownF	32, 3, 5	2,400
5	Paoli	R5	2,400
6	Trenton	R7	2,000
7	Temple	All	1,900
8	Bryn Mawr	R5	1,800
9	Fox Chase	R8	1,800
10	Torresdale	R7	1,700
11	Strafford	R5	1,600
12	Wayne	R5	1,500
13	Overbrook	R5	1,500
14	Ardmore	R5	1,500
15	Lansdale	R5	1.400
16	Radnor	R5	1,400
17	Ambler	R5	1,300
18	Glenside	R2, 5	1,300
19	Narberth	R5	1,200
20	Fern Rock R1	1,2,3,	5 1,100

SEPTA Regional Rail Station Use\*

\*1993-94 Regional Rail Census

#### Broad-Ridge spur.

The largest turnstile count on the Broad Street line occurs at the Olney Transportation Center. The additional volume of passengers using the Broad-Ridge spur contribute to the turnstile counts exhibited at the Olney station and other stations between Girard and the Fern Rock Transportation Center. Olney also serves multiple bus lines from surrounding and outlying areas that meet at the recently improved station. Patronage at Olney is much higher than the Regional Rail transfer point at the Fern Rock Transportation Center. Use of the Olney station would increase further with the proposed operation of light rail vehicles on Route 6 between Olney and Cheltenham Square Mall.

The two highest volume stations on the PATCO line are Center City stations. The 16th & Locust Street station is the station closest to the most intensely developed portion of Center City. The other station is at 8th & Market which has the same assets as the Market-Frankford station. The next two most used stations are at Lindenwold and Woodcrest, respectively. The first is the furthest station on the PATCO line at which parking is available. Lindenwold is also a transfer point to NJ TRANSIT's commuter rail line to Atlantic City. This reinforces the role of the Lindenwold station as the terminus of this line. The Woodcrest station is made highly accessible by direct ramps to and from I-295. The Ferry Avenue station provides the most convenient point of access to a number of communities south of the line via U.S. 130.

In 1983, SEPTA acquired the Pennsylvania portion of the region's commuter rail network and began the process of integrating these services into its own system. The most significant step of this process to date was completion of the Center City Commuter Tunnel and Market East station. This project made the system significantly easier to use and reduced the need to transfer between the commuter rail lines and the Market-Frankford line. Still, Suburban station remains the most heavily used station of the commuter rail system, because of its proximity to the most developed portion of Center City.

The table entitled "SEPTA Regional Rail Stations Usage" lists the 20 most used commuter rail stations in SEPTA's Regional Rail system. Eight are located on the Main Line portion of SEPTA's R5 line. The Main Line has traditionally been a strong rail commuter corridor with frequent service and high demand for station parking. Four others represent the most significant stations on the Doylestown portion of the R5 line. With the exception of the Lansdale station, all locations on this route are transfer points connecting other lines into Center City. Staggered train arrivals reduce the wait times at these locations, making the stations appealing to inbound commuters. The Lansdale station is a traditional focal point of rail activity, formerly serving as a connecting point for service to the Norristown and Telford areas. Many of the R5 trains to and from Center City terminate at this location.

Two other heavily used stations are located on SEPTA's R7 Trenton line. The Trenton station provides a transfer point between SEPTA service and NJ TRANSIT's commuter rail line to Newark and New York. A significant number of R7 passengers make this transfer because the service is less expensive than AMTRAK's direct service. The Torresdale station is convenient to parkand-ride commuters from Northeast Philadelphia via Grant Avenue. The Fox Chase station on SEPTA's R8 line is similarly convenient to Northeast Philadelphia commuters via Rhawn Street. The R7 line affords a slight time savings versus the SEPTA R3 West Trenton line, which is partially reflected by the low

volumes experienced at the Rydal and Meadowbrook stations on this line.

## Freight

Imported bulk cargoes account for a vast amount of total tonnage at regional port facilities. Port activity, which increased by 9% between 1992 and 1993, is subject to many factors, including international economic conditions and competition with other ports on the east coast.

During the last ten years, Philadelphia International Airport has shown steady growth in cargo traffic. Total annual tonnage enplaned and deplaned now exceeds 400,000 tons. Mail tonnage has annually increased by an average of approximately 5% since 1984, while other types of freight have increased by 12% each year.

An indication of freight rail activity in the region is provided by Ameriport, DRPA's intermodal transfer facility located near the Walt Whitman Bridge. In 1993, AmeriPort's volume increased from less than 100 lifts in January to over 3,000 lifts a month at year's end. Now, the facility supports the movement of both domestic and international containers and trailers through the Delaware Valley. Further detailing of freight movement levels in the Delaware Valley can be found in the *Intermodal Freight Plan* (DIRECTION 2020 Report No. 29).

#### Aviation

During the period 1980 to 1992, seven privately owned general aviation airports closed due to real estate development. Seaplane bases were deleted from the Year 2000 Regional Airport System Plan due to low operations levels. System capacity was reduced by 25%. During the period, demand for commercial operations increased 25%, concentrated at Philadelphia International Airport (PHL), while activity at all other airports, in the aggregate, remained constant. Nationally, privately owned airports in the FAA National Plan of Integrated Airport Systems (NPIAS) were also under pressure to close, especially in the densely populated Northeast and other areas with escalating real estate development activities. Although FAA recognizes over 5,000 airports in its NPIAS as critical to national aviation service, only 1,500 are protected from closure by public ownership or public capital investment.

	Exports				Imports			
	1992	1993	Change	%	1992	1993	Change	%
General Cargo	768,838	737,169	-31,669	-4%	3,995,603	4,288,093	292,490	7%
Bulk Cargo	1,541,468	1,458,295	-83,173	-5%	51,727,807	56,701,560	4,973,753	10%
Total Cargo	2,310,306	2,195,464	-114,842	-5%	55,723,410	60,989,653	5,266,243	9%

#### International Waterborne Commerce (in short tons)

Information furnished by the Delaware River Port Authority. Examples of general cargo: fruit, steel, chemicals, paper, meat, wood, cocoa, lumber. Examples of bulk cargo: petroleum, metal ores, fertilizer, coal, gas.

#### HISTORICAL TRENDS

	Walk				Bicycle		Combined Cha	Combined Change	
County of Residence	1980	1990	Change	1980	1990	Change	Number	Percent	
Burlington	10,599	8,140	-23.2%	631	659	4.4%	-2,431	-21.6%	
Camden	6,973	7,476	7.2%	495	595	20.2%	603	8.1%	
Gloucester	3,139	2,851	-9.2%	241	267	10.8%	-262	-7.8%	
Mercer	9,796	9,550	-2.5%	837	754	-9.9%	-329	-3.1%	
NJ Total	30,507	28,017	-8.2%	2,205	2,275	3.2%	-2,420	-7.4%	
Bucks	7,422	6,876	-7.4%	593	658	11.0%	-481	-6.0%	
Chester	7,860	7,647	-2.7%	443	312	-29.6%	-344	-4.1%	
Delaware	13,266	12,698	-4.3%	649	635	-2.2%	-582	-4.2%	
Montgomery	15,581	11,920	-23.5%	1,081	607	-43.8%	-4,135	-24.8%	
Philadelphia	63,615	66,446	4.5%	2,516	3,637	44.6%	3,952	6.0%	
PA Total	107,744	105,587	-2.0%	5,281	5,849	10.8%	<u>-1,589</u>	-1.4%	
TOTAL	138,251	133,604	-3.4%	7,486	8,124	8.5%	-4,009	-2.8%	

# Non-motorized Commuting Trends, 1980-1990



Packer Avenue Marine Terminal



## Bicycle and Pedestrian Traffic

The Census provides some insight into the levels of bicycle and pedestrian work trips generated in the DVRPC region between 1980 and 1990 as well as recent trends. Walking to work is a far more prevalent activity than bicycling, though less so in 1990 than in 1980.

In 1990, 16 times as many commuters walked as bicycled to work. In 1980, 18 times as many commuters walked. The net effect of this trend for both modes, however, has been a 2.8 percent loss in bicycle and pedestrian trips. The gains in bicycle commutation relative to walking may indicate that a greater acceptability of bicycle use by employers and employees. At the same time, the growth in both residential and employment development in outlying areas has increased employment trip lengths, contributing to the net decline in overall non-motorized commuting.

As one might expect, the greatest gains in both pedestrian and bicycle travel in the region were effected in Camden and Philadelphia counties, which include communities oriented to walking and bicycling. No other county exhibited growth in its number of walk commute trips.

Although the focus of this assessment is walking and bicycling as transportation options for commuters, the use of bicycles is broad and includes recreation and other casual trips such as shopping, running errands and other personal business trips. These uses are not addressed in this section because of limited information about the extent to which the region's population uses bicycles for these purposes.

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#### **V PROJECTED TRENDS**

### **MODEL CHARACTERISTICS**

## Travel Forecasting Model

DVRPC employs a computerized travel forecasting process to simulate and project the use of highway and transit facilities in the region. This model is driven by regional socio-economic data and transportation facilities and operating conditions.

## Regional Socio-economic and Transportation Data

In the travel forecasting model, the region is divided into relatively homogeneous small areas called "traffic zones". Traffic zones are intended to serve as small aggregations of residences, employment and commercial centers, and other types of development between which trips take place. In this regard, trips are "generated" based upon the extent of the development within the zones. Equations are used to convert these socio-economic parameters into daily trips. Within the DVRPC region, traffic zones are delineated for the entire nine county area and roughly follow the block group and tract boundaries of the Census. For the purposes of simulating the travel conditions in the year 2020, data is disaggregated into 1,335 traffic zones. The types of information collected and projected at the traffic zone level include:

- Population
- Employment by standard industrial classification (SIC) group

- Employed residents
- Number of households, stratified by numbers of cars available (0,1,2,3+)
- Total automobiles

The year 2020 population and employment projections were obtained from the DVRPC Year 2020 County and Municipal Interim Population and Employment Forecasts adopted in June 1993. The projected number of households in each zone was based upon the extrapolation of county level trends in the average size of all households. The projected number of employed persons per zone was based upon the application of a factor to these total household figures. The auto ownership data was based upon the stratified household information from the Census, and projections were based upon the historic trends.

In addition to trips generated within the zones, two other kinds of trips must be considered: trips that have one end outside the region and one end within the region; and, trips which pass through the region, where both the origins and destinations are points outside the region. Both types of trips are distributed based upon cordon line survey results. There are 113 highway crossings of the region's boundary (cordon line) where such trips occur.

Transportation facility characteristics are also important to the model. Highway characteristics control the flow of traffic along a facility. Important characteristics include: length, uncongested travel speed (or time), hourly capacity, number of lanes, functional classification (e.g., freeways, arterials, local roads) and area type (i.e., CBDs, urban, suburban, and rural areas). Other specialized characteristics may be employed for particular situations, such as one-way streets or toll facilities.

Similarly, transit characteristics govern the ability of these facilities to convey passengers. It is recognized that for those trips where auto as well as transit and/or other modes are viable options, different types of transit modes hold different levels of appeal. These are based on various factors some of which are difficult to quantify. The computer model distinguishes between each travel mode to allow for these ridership tendencies to be considered.

#### Model Characteristics

The DVRPC travel simulation process follows the traditional four-step methodology: trip generation, trip distribution, modal split and travel assignment. DVRPC employs the battery of computer programs developed by the US DOT for travel simulation, the Urban Transportation Planning System (UTPS). Staff has worked with these programs over the last two decades, refining some of the component models and calibrating them to the Delaware Valley region. These models are explained briefly below. A complete description of the simulation and model structure can be found in the DVRPC publication Testing and Adjusting **DVRPC** Travel Simulation Models with

1980 Census Data, September 1985. The models have been subjected to a preliminary validation using 1990 Census data and updated traffic counts.

*Trip Generation*—Trip generation is the first step in the modeling process. Person, truck and taxi trips are generated from traffic zone estimates of households and employment through the use of trip rates disaggregated by trip purpose (home based work, home based non-work, non-home based), auto ownership and area type. Estimates of external and through highway and transit trips are developed from population and employment estimates in counties surrounding the Delaware Valley region.

Trip Distribution—Trips from traffic zones within the region are allocated to destinations within the region with a "gravity" model. This model assumes that the propensity to travel to a destination zone increases with the attractiveness of the destination (as measured by employment) and decreases as the difficulty of traveling between zones increases. This limitation is measured by travel time and cost for both the highway and transit modes.

*Modal Split*—The modal split model divides the trips between the region's traffic zones into transit and highway components. Generally, the tendency to use public transit increases with the relative transit-to-highway service levels. The relative service levels are estimated through highway and transit out-of-vehicle time and in-vehicle time; highway operating costs and parking charges; and transit fares. In addition, auto ownership, type of transit service, household income, trip purpose and the consumer price index further define the trip-maker's choice between highway and transit.

The modal split model also determines the average number of persons per automobile. This value is used to convert auto person trips to auto vehicle trips. Auto occupancy is estimated as a function of trip purpose and trip length.

*Travel Assignment*—The final step in the process assigns the estimated highway vehicle and transit person trips to specific facilities. This is accomplished by determining the best (i.e., minimum time and cost) route through the highway and public transit networks and allocating the transit trips to the transit facilities and highway trips to the highway facilities. Highway capacity is "restrained" in that congestion levels are considered in determining the best route.

Significant amounts of vehicular trips also occur on local streets not included in DVRPC's regional highway network. For purposes of calculating mobile source emissions, this "off-network" vehicle miles of travel (VMT) was estimated separately by county based on the mileage of missing streets and an average off-network travel volume. For the region as a whole, it is estimated that 11.4 percent of VMT occurred on local streets in 1990.<sup>1</sup>

#### Highway Source Emissions Modelling

Highway source emissions analysis must be performed on a regular basis for the Philadelphia nonattainment area. The estimation of regional emissions requires many inputs. These factors include population and employment estimates and forecasts, and travel data, including auto and transit trip volumes and auto speeds. Composite emissions factors, derived from the model MOBILE5a are applied to highway vehicle travel data to estimate three types of emissions: volatile organic compounds (VOCs), oxides of nitrogen (NO<sub>x</sub>) and carbon monoxide (CO).

#### Average Daily Highway Operating Speeds

Emission factors calculated by MOBILE5a vary significantly with vehicle operating speed. For this reason, the amount and distribution of the mobile source pollutants are influenced by the accuracy and sensitivity of the method used to convert travel model measures of highway congestion into operating speed. For this analysis, a complex set of curves is used to estimate operating speed. These curves were taken from a report prepared by Creighton, Hamburg, Inc. for the FHWA.<sup>2</sup>

<sup>2</sup>Creighton, Hamburg, Inc. *Freeway-Surface Arterial VMT Splitter*. Federal Highway Administration, Washington, D.C., 1971, pp. 22-24.

<sup>&</sup>lt;sup>1</sup>Conformity of the Delaware Valley's FY 1994 Transportation Improvement Program, DVRPC, August 1993, p. 20.

A separate set of curves is used for freeways and arterials. The freeway curves relate peak hour operating speed to the speed limit, capacity and peak hour simulated vehicular volume. The arterial curves relate peak hour speed to the speed limit, capacity, traffic signal density (per mile), free flow speed and the peak hour simulated volume.

Peak hour volumes are estimated from simulated daily volumes taken from traffic counts through the use of a peak hour percentage (determined by functional class of the road and area type). Speed limits, signal densities, and free flow speeds were input as a look-up table by functional class and area type. DVRPC travel time surveys have found that daily speeds are on average about 10 percent higher than peak hour speeds.<sup>3</sup>

The speeds from the curves have been validated with available travel time survey data. Additionally, the freeway curve required the addition of a minimum speed of 8 to 10 mph (depending on area type) to the Creighton, Hamburg formulation to adequately replicate DVRPC's travel time survey data.

#### Estimation of Mobile Source Emissions

Using computerized software developed for the TIP Conformity Process, mobile source emissions are calculated based on simulated VMT and speed data (rounded to nearest mile per hour) from the 1996, 2005, 2015 and 2020 highway assignments. Emissions for individual roadway segments are calculated to reflect the appropriate set of MOBILE5a emissions factors. These emissions are then aggregated to county and state totals.

VMT projected to occur on local streets not included in the regional network is estimated independently. Prior to calculating emissions, off-network VMT is apportioned to five-kilometer grid cells based on the distribution of network VMT. Simulated travel speeds on included local streets are used as a proxy for speeds on excluded links. Emissions are then estimated for five kilometer grid squares and summarized by state.

Emission factors produced by the MOBILE5a computer program vary significantly depending on the settings of various policy and climatic options. These are included in order to tailor the output to both meteorological conditions and state and local emissions control programs. Emissions factors must be calculated for both Pennsylvania and New Jersey, as inspection procedures and fuel vapor recovery systems vary. For purposes of testing Moving People and Goods, the required sets of MOBILE5a parameters were developed as a cooperative effort between the staffs of the Pennsylvania Department of Environmental Resources, New Jersey Department of Environmental Protection and Energy, and EPA regions II (New Jersey) and III (Pennsylvania).

<sup>&</sup>lt;sup>3</sup>Conformity of the Delaware Valley's Transportation Improvement Program, DVRPC, August 1993, p. 20.

Based on these parameters, the MOBILE5a computer program is used by DVRPC to prepare separate emissions factor tables appropriate for the years 1996, 2005, 2015 and 2020. For each forecast year and pollutant, the emission factor table consists of 53 speed entries, calculated by whole mile-per-hour increments from 3 to 55 mph. These factor tables are then used to estimate emissions for each highway network alternative using the emissions calculation procedure.

## **PROJECTED CONDITIONS**

In order to quantify the impact of *Moving People and Goods* on mobile source emissions, DVRPC's travel simulation model was run eight times. Separate *trend* and *plan* (i.e., no-build and build) runs were executed for the years 1996, 2005, 2015 and 2020. Plan runs incorporated changes to the highway and transit networks based on most of the facility recommendations found in Chapter VII. Additional air quality benefits are anticipated to accrue owing to policy and additional facility recommendations that are beyond the present capabilities of the computer analysis.

Between 1990 and 2020, trend travel projections show the implications of continuation of the previously discussed changes to residential and employment distributions. Further disbursement of home and work locations will further tax the region's network of highways as automobile trip making increases. The recommendations of the plan address these trends through the integrated programming of transportation improvements which encourage shared-ride alternatives for work trips and other means to reduce congestion and improve mobility.

The table on the next page summarizes the effects of implementing the plan upon transit, driver and vehicle trip-making in the region. In all three cases, the benefits of the modelled facility recommendations upon travel patterns can be seen.

Transit trip origins were obtained for the region given (a) projected transit services, (b) regional demographics and (c) the modelled mode choices of individuals. One transit trip origin occurs for each trip between two locations via transit, regardless of the number of transit vehicles boarded en route. Over this time period, trend conditions point toward a slight decline (2.7%) in transit ridership. Selective expansion of the system, through new and more frequent services and new facilities, reverses this decline. The net effect is a 4.7% increase in ridership over the trend condition which translates into an additional 40,000 transit riders per day. Automobile driver trip-making is anticipated to increase 23.1% over the 1990 to 2020 period under trend conditions. On the other hand, the regional population and employment growth rates are only projected to be 9.9% and 20.0%, respectively. The expansion of transit services, particularly in presently unserved areas and the improved integration of existing services diminishes this increase slightly. The net effect is a 0.2% decline, or roughly 26,000 fewer

	1 <u>02 07 07 07 08 07 07 07 07 07 07 07 07 07 07 07 07 07 </u>	1990	1996	2005	2015	2020
Transit	Trend	859	851	843	842	836
	Plan	859	851	847	872	876
Driver	Trend	10,971	11,586	12,362	13,167	13,505
	Plan	10,971	11,586	12,359	13,149	13,479
Vehicle	Trend	14,052	14,906	16,006	17,084	17,539
	Plan	14,052	14,906	16,003	17,066	17,513

#### Projected Trips per Day (Thousands)

automobile driver trips per day with implementation of the modelled changes. This impact is not as great as the aforementioned transit ridership gain owing in part to improved automobile access to the transit system. The increase in total vehicle trips reflects the above change in automobilé travel. The total vehicle trip parameter is intended to more closely replicate the amount of travel that is actually occurring on the region's roadways. It includes truck traffic, taxi trips and additional trips across the regional boundary. As travel destinations become more scattered throughout the region, it might be assumed that the number of miles travelled for the average vehicle trip will increase over time. This means that the number of vehicle-miles travelled can be expected to increase faster than the number of vehicle trips made, and indeed this is what is projected to occur.

Under trend conditions, total VMT within the region is projected to increase 33.2% between 1990 and 2020. (VMT is calculated for a typical summer day for the purpose of estimating emissions which cause ozone.) The increase is relatively

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Explored and a second se	na hag titi (titi (titi (2005))-(nagan) Qowini (2001)	1990	1996	2005	2015	2020
Trend	New Jersey	34,443	36,068	40,305	44,121	45,600
	Pennsylvania	64,565	70,195	77,762	83,829	86,313
	REGION	99,008	106,263	118,067	127,950	131,913
Plan	New Jersey	34,443	36,068	40,277	43,814	45,321
	Pennsylvania	64,565	70,195	77,534	83,480	85,983
	REGION	99,008	106,263	117,811	127,294	131,304

#### Projected Vehicle Miles of Travel per Summer Day (Thousands)

evenly distributed between the New Jersey and Pennsylvania portions of the region. Implementation of the plan improvements results in a net 0.5% decline in VMT relative to this increase. This amounts to about 609,000 fewer vehicle-miles travelled per day on the region's highways by the year 2020. The reduction obtained is slightly greater in the New Jersey portion (-0.6%) relative to the Pennsylvania portion (-0.4%). This to some degree reflects the impact of the planned fixed guideway transit service extensions for Burlington and Gloucester Counties. The largest reduction in VMT relative to the trend condition is anticipated to occur by 2015, at which time major transit improvements counted on to reduce the VMT increase are assumed to be implemented. After 2015, continued changing demographic conditions reduce the impacts of these improvement on travel patterns.

Increasing highway travel, as indicated by the increasing VMT levels, will also lead to increasing levels of congestion. One manifestation of this growing problem is the decline in average vehicle travel speeds for both Pennsylvania and New Jersey. As the final segments of interstate and other major highways in the region (e.g., the Blue Route [I-476] and the Exton Bypass [U.S. 30]) become opened to traffic, average travel speeds in the region peak during 1996 at 28.5 mph in New Jersey and 25.4 mph in Pennsylvania. A steady decline is then exhibited for trend conditions through the year 2020 resulting in average travel speeds of 27.6 mph and 24.7 mph for New Jersey and

Pennsylvania, respectively.

By selectively improving the highway network and increasing the quality and availability of shared ride opportunities, congestion on the region's highways diminishes to some degree. While this is not enough to compensate totally for increases in highway travel, the effects are perceptible on both sides of the river. Given the projected VMT levels for the year 2020, roughly 6,000 travel hours will be saved per day in New Jersey and 55,500 hours in Pennsylvania. These changes are gradual over the life of the plan. This difference eventually declines beyond the 2020 horizon as both the baseline and improved highway systems become congested. It should be noted that the increase in operating speeds is averaged over all types of highway facilities; therefore, it should be assumed that traffic begins to divert from congested limited access and principal arterial corridors to the lower-capacity parallel roadways in the corridor.

### AVIATION

Moderate growth of 2% per year is forecast for commercial operations, solely at Philadelphia International Airport (PHL), while growth in business and general aviation and operations is predicted to be slower at 0.6% per year. This activity will not require additional airports but points out the need for refinements and expansion at existing facilities.

These predictions are sensitive to the cost

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These predictions are sensitive to the cost of aircraft and flying for the corporate and general aviation flyer, which in turn affects the fleet size and production levels of new aircraft. Costs of commercial service are anticipated to remain generally in line or lower in comparison to family discretionary income and business travel expenditures.

The current level of commercial traffic at PHL results in delays costing airlines millions of dollars per year. Increased volumes will require additional runway capacity and segregation of noncommercial traffic. In the suburbs, two problems exist: there is insufficient hangar storage at airports near businesses wanting to base corporate aircraft in the more dense suburbs; and, in other suburban locations, airports which provide needed ground access to the aviation system are in danger of closing, creating disenfranchised markets and aircraft crowding at remaining airports. DVRPC anticipates that, in this region, up to 13 additional airports (50% of suburban

capacity) could close by 2020.

Other issues which will push federal funding policies in future years include the need for reductions in community noise impacts which affect fleet cost and airport layout. Increased emphasis on integration of freight capacity in passenger airlines and freight-only carriers at commercial airports will diversify the role of the major airports in satisfying demand.

In the DVRPC region, since no new public airports are anticipated to be needed in the next 25 years, ground access improvements by highway and transit will compete with airside projects for scarce federal grants at selected existing facilities. Integration of passenger modes, although effectively completed at PHL, can be enhanced with transit service increases at suburban airports.

Airspace coordination of aircraft movements at PHL and surrounding airports is under constant review. Major expansions, where recommended, will only occur after airspace clearances are resolved. The new Global Positioning System (GPS) technology will improve electronic navigation and landing/takeoff safety by making satellite guidance available to any airport.



Philadelphia International Airport

#### FREIGHT NEEDS

In recognition of the unique needs of efficient goods movement, DVRPC has created a Goods Movement Task Force with broad-based industry representation. The Task Force serves as an advocate for the goods movement community in the planning process (e.g., in the identification of improvements and formulation of longrange plans). Continuation of this task force will assure the viability of a link between planning for an effective goods movement network and goods movement service providers and users.

Specific recommendations to bolster goods movement are identified in Moving People and Goods, largely with the assistance of the Task Force. To this end, data collection efforts have been intensified, as demonstrated by the recent survey of trucks on area bridges. The final result of this process are annual submissions of candidate transportation improvement projects, specifically designed to facilitate commodity flows, to the appropriate agencies. In addition, a long-range plan for goods movement is under development by DVRPC. That plan will consider all parts of the freight network and how they relate to one another: airports, highways, maritime ports, and rail lines. The plan will also seek to establish a context for identifying and ranking needs peculiar to the freight network.

## Trucking Operations

In order to improve truck operations in the region, several issues have been identified,

including: promotion of use of the turnpikes and toll facilities, allowances for heavier international containerized cargo, improved access to intermodal and shippers' facilities, implementation of a congestion management system and the upgrading of restricted bridges.

#### Rail Freight

Railroads are an important aspect of freight intermodalism. In the Delaware Valley, issues which must be addressed to assure the achievement of maximum rail efficiencies include: initiatives to combine more freight and passenger services, means to improve rail access to and between ports, strategies to enhance highway access to intermodal terminals, improvement of highway grade crossings, improvement of terminal capacities, preservation of rights-of-way, and a doublestack route to and from points south.

#### Ports

Among the issues confronting the port are dredging of the Delaware River and encroaching cross-purpose development. Currently, much of the Delaware River is maintained at a depth of 40 feet. As a result of deeper drafting vessels, such as oil tankers, a depth of 45 feet is now desirable. At issue are the cost of this project, ongoing maintenance of the depth, and procedures for dealing with the dredge spoils. On land, along waterfront areas such as Columbus Boulevard in Philadelphia, residential and commercial development is infringing upon port-related facilities and is threatening their operations.

#### **OTHER INTERMODAL NEEDS**

One of the most important changes in the ISTEA legislation from previous transportation initiatives is its emphasis on interconnecting modes of travel to create a more unified transportation system. Such modes include, but are not limited to, "highway elements,...ports, canals, pipeline farms, airports, marine and/or rail terminals, truck terminals and intercity bus terminals".<sup>4</sup> To this end, one of the management systems established by the act deals exclusively with such connections. This intermodal management system (IMS) evaluates programs, projects and activities within an urban area intended to provide intermodal connections. The IMS identifies efficiency measures and performance standards in order to develop and test various improvement strategies and actions. Future renditions of the long range plan for the DVRPC region need to be coordinated with these standards and

strategies so that intermodal improvements can be fully considered.

Some of the IMS recommendations affect freight movement in the region. These projects should be considered within the context of overall freight movement needs. Other intermodal improvements affect the trip-making of individuals. These improvements may involve public transportation, highway, non-motorized and other modes. As such, they are unique and are considered separately from other types of improvements. In all instances, the potential for integration of modes should be maximized.

The intermodal needs of transit passengers must also be addressed. Transit operating policies such as information systems, hours of operation and the provision for timed transfers should be coordinated. SEPTA has recognized the need to plan for intermodal transfer in their document A Vision of the Future: Planning for the Year 2010 (May 1991). This planning statement documents 13 existing and 31 proposed Transportation Centers intended to serve as intermodal transfer points. These locations will be listed in the initial inventory of intermodal connections included in the IMS.  $\square$ 

<sup>&</sup>lt;sup>4</sup>Draft regulation establishing 49 CFR Part 614, Subpart G §500.703 as published in *Federal Register* Vol. 58, No. 39, Tuesday March 2, 1993 p. 12122.

## VI REGIONALLY SIGNIFICANT POLICY RECOMMENDATIONS

The initial thrust of the DIRECTION 2020 effort revolved around the identification of regional goals and objectives that would address both transportation and land use issue areas considered of importance over the period until 2020. Eight regional goals were established and 56 objectives to foster their achievement. Four of the goals pertain directly to the provision of transportation: (relieving) traffic congestion, (improving) air quality, (supporting) freight movement and (expanding personal) mobility. Major aviation system policies are included at the end of this chapter as a separate section.

A series of complementary regional policies have been developed to accomplish the regional goals and objectives. These policies can be reviewed in their entirety in *DVRPC Year 2020 Land Use and Transportation Plan: The Policy Agenda* (DIRECTION 2020 Report No. 21). Aviation policies have also been developed and can be viewed in their entirety in the *Year 2020 Regional Airport System Plan*.

This chapter contains the 74 transportationrelated actions and seven aviation actions deemed regionally significant based upon the nature of the changes required and the anticipated benefits in achieving the corresponding objective. These actions are recommended to the identified organizations for consideration as appropriate strategies (together with the facility improvements) in achieving regional goals. Each action, together with the required participants are furnished in **boldface** text. More detailed guidance is also provided for portions of the region beyond the delineated transportation corridors. This section provides general guidelines regarding the acceptability of different types of transportation improvements in different areas.

#### LINK TO LAND USE BY AREA TYPE

One of the key concepts employed in integrating land use and transportation planning in DIRECTION 2020 is constraining decentralized development through the selection of transportation investments. By concentrating transportation improvements within centers and along corridors, an economic inducement will be created for growth to concentrate in these areas. Conversely, the withholding of transportation improvements from other areas could create an economic disincentive for development away from the centers and corridors.

For the most part, this policy translates into a restriction against certain types of transportation investments in outlying areas (e.g., major capacity expansions). However, significant portions of the region's developed area were also not considered in the center and corridor analyses. As a result, the following table, *Transportation Improvement Matrix*, has been developed to provide more detailed guidance for the implementation of candidate transportation improvements throughout the region based on land use .

# TRANSPORTATION IMPROVEMENT MATRIX<sup>1</sup>

	Roedway	Public Transit	Freight	Passenger	Traffic	Other Improve-
EXISTING DEVELOPED	AREAS <sup>3</sup>	Tansı	rieight	Interniodal	Operations	mento
Major Facilities <sup>4</sup> Minor Facilities	0	•	•	•	•	•
REGIONAL AND COUNT	Y CENTERS				a de la companya de l	10240-10-00-1-040-1-0-0-1-1-0-0-1-1-1-1-1-1
Major Facilities Minor Facilities	0	۲		•		
REVITALIZED CENTERS				***		
Major Facilities Minor Facilities	0	۲		•		•
GROWTH CENTERS				nin ole adver et convergen in an anno 1999.		
Major Facilities Minor Facilities	0			•		•
FUTURE GROWTH AREA	\S					ni n
Major Facilities Minor Facilities	0	0		0 0	0 0	
EXISTING OR PROPOSE	D OPEN SPAC	E				
Major Facilities Minor Facilities	0	0			0	•
RURAL AND AGRICULTU	JRAL AREAS					
Major Facilities Minor Facilities		0	0	0	Ō	•
<ul> <li>Improvement type is</li> <li>Improvement type is</li> <li>Blank indicates improvement</li> </ul>	appropriate in appropriate ur ovement type is	virtually all der certain s usually no	cases. conditions t appropri	s. ate.		÷

<sup>1</sup> Travel Demand Management improvements are implemented regionwide and are not included here. <sup>2</sup> Includes Safety & Environmental Improvements, Network Reconstruction & Maintenance, Enhancements & Amenities, and Bicycle & Pedestrian Improvements, which are appropriate in all areas.

<sup>3</sup> Land use categories as specified in DIRECTION 2020 <u>Guiding Regional Growth</u>, DVRPC 1995.

<sup>4</sup> Highways and transit lines to be assigned to Major or Minor category designations.

#### **TRAFFIC CONGESTION**

Traffic congestion shall be eased through the reduction of single occupant vehicles by better integrating automobile, public transit, bicycle and pedestrian facilities; encouraging changes in commuters' travel habits; and improving the efficiency of existing transportation services.

## Policy: Provide More Non-Auto Options for Commuters

Improve area coverage and operation of transit service-Most transit systems today are collections of routes which have evolved over time through a series of small adjustments, each in response to a perceived need. Now thought must be given as to how well the routes work collectively as a system, or whether the service is as competitive with the automobile as it might be. To increase market share, potential customers must be offered reliable transit services that go where they want to go, when they want to go and at a *price* they are willing to pay in terms of fare, travel time, comfort and other perceived qualities. Routes may be restructured to better match current trip patterns, reduce travel times and cut operating costs. Park and ride lots can be used to extend the reach of express routes to lower density areas. Separate rights-ofway can be provided in high density corridors to allow transit vehicles to bypass highway congestion that slows autos. New technology can be used to improve communications, information systems, fare collection and generally improve the user friendliness of the

system. Strategies to improve coverage and service include the following—

- Transit operators should use advanced fare collection systems to reduce time needed at stops and stations, to ease payment barriers, to permit fare structures that better match the service and to collect ridership data. (SEPTA now operates an extensive pre-paid pass and automatic fare reading system.)
- Transit operators should facilitate transfers through coordinated scheduling, improved pedestrian flow at transportation centers, better directional signs, simplified payment procedures and use of vehicle-tovehicle communications. The last item could reduce missed connections by alerting drivers when and where to expect transfers.
- Transit operators should improve services in lower density areas through simplified, timed transfers at key transfer points, demand-responsive vehicles to feed fixed routes and expansion of park and ride lots.
- Transit operators should develop Intelligent Transportation Systems (ITS) programs to incorporate into their operations. Such programs should include both near term and long term projects.

# Increase the number of multi-modal transportation centers and park and ride

*facilities*—Transportation centers are facilities where a number of different transit lines, including rail lines and/or buses, come together and are linked directly and conveniently to adjoining land uses. Park and ride lots are facilities where drivers or bicyclists can park and transfer to carpools, vanpools or transit vehicles. Both facilities serve to reduce single occupant vehicles and congestion. To increase the number of multi-modal transportation centers and park and ride facilities—

 Municipalities should enact appropriate zoning and land use controls to encourage an appropriate land use mix and density in the area of transit centers. The centers should blend appropriate land uses and densities, as well as circulation, parking and bicycle and pedestrian improvements needed to link transit with nearby activities.

Encourage pedestrian, bicycle and transitoriented land use and mixed-use development—The Delaware Valley region has a well-established network of existing transit service, including commuter rail, light rail and bus systems. However, for the transit system to maintain its ridership or expand service to other areas, it is essential to improve the links between land uses and surrounding development. To encourage transit-oriented land use and



Norristown Transportation Center

mixed-use development-

Municipalities responsible for local area planning decisions should—

- Establish site design standards within a subdivision and land development ordinance that require new commercial or residential developments to be oriented toward streets with bus service or require preferential parking for carpools and vanpools adjacent to building entrances. If a development is in proximity to a rail station, the amount of required parking could be reduced and developers given incentives or bonuses to operate connecting shuttle services. Municipal design standards should also address the layout and arrangement of streets, bikeways and sidewalks, by including provisions for walkways, lighting, benches and bus turn-off facilities.
- Grant density bonuses for developer improvements, such as a transit center or locating adjacent to a regional rail station. An overlay zone or special district may be created at an intersection or around a rail station, to allow more intense and efficient use of land, a unique mix of uses, or to require the provision of amenities such as bus stops or shelters. Planned unit developments should be encouraged to coordinate development of larger tracts of land with new or expanded transit service and a mix of compatible uses.

**Regional transit agencies** should work with municipalities to—

Consider joint development proposals, with municipalities, on land surrounding rail stations. Higher density development can both increase ridership on the transit line and provide an economic stimulus to the older communities along the rail lines.

## Policy: Use Transportation Demand Management Techniques for Corridor and System Planning

Establish programs aimed at reducing the total number of vehicle trips—Three ways to reduce total trips are: combining trips, ridesharing and eliminating the need for trips. Eliminating trips can be done through telecommuting (working from home with the aid of computers, modems and fax machines or from a neighborhood telework center), compressed work weeks (working the same hours per week or biweekly period in fewer, longer days) and land use strategies (siting of residential development and services within walking or bicycling distance of employment centers). The following actions will reduce the total number of trips-

Pennsylvania and local governments should provide tax incentives to employers to initiate telecommuting and compressed work week programs. Benefits and incentives for employees who carpool or rideshare should also be identified. New Jersey currently provides a state tax deduction.

- State, county and municipal governments should provide tax incentives to employers who offer appropriate incentives to employees to locate near their workplace or near convenient transit service.
- Municipalities should revise zoning ordinances to allow a mix of land uses and pedestrian scale activity centers. For example, commercial uses should be permitted in office parks so employees can walk or bike to restaurants, banks and stores. Residential, commercial and office uses should be permitted in the same areas so employees can live nearby, thus allowing them to walk or bike to work and to their errands instead of having to drive. Site design standards should be revised to make it easier to walk or bike to work: buildings should be located and oriented toward the street; sidewalks, bus passenger shelters and bicycle parking should be provided; and parking lots should be located behind buildings.
- The region should study the impacts of adopting a tax on parking facilities to be borne by automobile commuters which would provide funding for travel demand reduction programs.

## Policy: Optimize Efficiency of Existing Transportation Systems

Reduce traffic congestion along travel corridors and at critical intersections through incident management, access control, needed highway improvements and advanced technology systems— Nationally, over 50 percent of the highway delay can be attributed to incidents or accidents. Incident management, including detection, emergency response and managing traffic flow, can significantly minimize vehicle delays. In some instances, modifications to the highway network itself must be made to address congestion problems. Among these are instances where "missing links" exist in higher designed facilities. Advanced technology systems are also being used to manage recurring congestion through advanced traffic control systems, ramp metering and traveler advisory systems. In order to implement incident management, access controls and advanced technological systems, the following actions should be undertaken-

- State DOTs should station roadside assistance vehicles at strategic locations adjacent to all heavily traveled routes during peak travel periods.
- PennDOT, together with county and municipal officials and the general public should develop and implement an access management plan and program in Pennsylvania.
- State DOTs, state and local police departments, transit operators and traffic reporting firms should collectively institute a televised information service on regional highway and transit travel conditions.

- State DOTs, toll authorities and transit agencies should design and implement special bus and HOV access gates and lanes at toll plazas to reduce delays and thereby travel times for these vehicles.
- State DOTs should develop a prioritized list of candidate maintenance projects on a biennial basis for problem locations stemming from poor geometric and pavement conditions.

## AIR QUALITY

The region's air quality shall be improved by reducing the number of single occupant vehicles, promoting alternative travel modes and encouraging other measures that limit emissions from mobile sources.

## Policy: Facilitate Regional Compliance with the Clean Air Act Amendments of 1990

Integrate air quality standards into the Transportation Improvement Program— Air quality concerns are an integral component in the region's TIP process. Each TIP undergoes a conformity analysis, required by the Clean Air Act, to demonstrate that the combined effects of implementing the projects in the TIP will meet various emissions tests and will help attain clean air standards. Many TIP projects will have a positive effect on air quality by reducing automobile trip-making and delay, mitigating congestion and decreasing vehicle miles of travel (VMT). In order to further integrate clean air objectives into the TIP, the following is recommended—

 DVRPC should provide for innovative programs and technologies in the TIP that lead to reduced emissions. A placeholder should be used as a method to assure funding before the programs are specifically defined.

## Policy: Encourage the Use of Alternative Transportation Modes

**Promote the use of public transit and ridesharing**—Congestion on the region's highways has increased considerably in the past decade, partially negating the advances in air quality attributable to today's cleaner fleet of automobiles. Reducing auto travel not only limits the direct emissions from vehicles, but also reduces emissions by increasing average speeds (at which emission rates are lower). Promoting the use of ridesharing and high occupancy vehicles can be an effective means to reduce congestion and improve air quality.

Several steps can be taken for the region to increase the use of high-occupancy vehicles—

Municipalities and counties should design and adopt regulations which encourage the use of transit and sharea-ride through development controls.

- State and county governments and transit operators should address travel needs in areas where transit services have been discontinued due to insufficient funds or reasons other than local opposition.
- Transit operators, DVRPC and interest groups should advocate changes in impact fee laws to give priority to transit improvements where transportation related improvements are needed from developers to mitigate the impact of the project. In Pennsylvania, this would require amendment of the existing impact fee law.
- DVRPC, together with the states and the counties, should use the flexible funding provisions of ISTEA to provide additional funding for transit operators while maintaining and meeting highway needs and working within the financial constraints of the TIP.
- Improve and expand bicycle and pedestrian facilities—Bicycle and pedestrian facilities should be integral components of the region's transportation network. Providing convenient pedestrian access and safe facilities for bicycles can provide options for non-automobile travel and help to improve air quality. Both the Pennsylvania and New Jersey Departments of Transportation have recognized the importance of these alternate modes of travel by establishing Bicycle and Pedestrian Coordinators in their offices.

For the region to improve and expand bicycle and pedestrian options—

- PennDOT and NJDOT should establish policies for bicycle access on the roads and bridges of the region where such access is appropriate, compatible and safe for both cyclists and motorists. Existing roadways where access is feasible and the types of roadways or facilities where access should be accommodated as a component of future improvements should be identified.
- DVRPC should identify and map existing trails and facilities, with the information made available widely throughout the region, to encourage the active use and upkeep of such facilities.
- The DVRPC long range plan should identify potential future facilities that would help create integrated and coordinated linkage of bicycle and pedestrian facilities. Links should be focused on the major origins and destinations of trips, such as population centers, employment centers, shopping centers, schools, parks and transportation centers.
- Regional employers should encourage the use of bicycles for commuting by providing storage facilities, showers, lockers, emergency roadside assistance, a "guaranteed ride home" program for emergencies or inclement weather and other employee benefits.

#### REGIONALLY SIGNIFICANT POLICY RECOMMENDATIONS

- Municipalities should utilize zoning and site design standards in subdivision ordinances to require pedestrian and bicycle access and facilities in new or expanded developments.
- Policy: Encourage the Use of Transportation Control Measures throughout the Region

Expand the use of Employer-based Share-A-Ride (SAR) Programs-SAR can be a key strategy to reduce the number of single occupant vehicles in the region. The mode of travel for work-based trips can be greatly influenced by employer policies and incentives. An employer's decision about work place location, for example, determines if employees can take transit to work or if they can walk to nearby locations to eat or run errands. If an employer fully subsidizes employees' monthly parking charges but does not subsidize any costs for employees who take transit or bicycle to work, employees may be more inclined to drive. The following actions will improve the effectiveness of employer-based SAR-

- Pennsylvania and local governments should provide tax incentives for employers who implement SAR programs. New Jersey currently provides a state tax deduction.
- Transit operators and DVRPC should encourage TMAs and regional employers to develop regional guaranteed ride home programs.

 Employers, developers, homeowners' associations, states, local governments, civic groups and TMAs should establish local community transit services in residential areas surrounding employment centers. These services must be coordinated with regional transit services.

Maximize the use of low-emission vehicles and low-polluting fuels-Attaining the standard for ozone in large metropolitan areas requires a substantial decrease in the emissions of precursor pollutants. These reductions cannot come through a decrease in demand alone and will require the use of cleaner vehicles and fuels. Currently, states in the northeastern United States are deliberating over the adoption of more stringent new car emissions standards as recommended by the Ozone Transport Commission. Although several requirements of the CAAA will bring cleaner vehicles and fuels to the region, more can be done through local initiatives such as those described below-

- State DOTs, fleet operators and gasoline retailers should increase the availability and visibility of alternative fuel refilling locations throughout the region. These groups could support initiatives to establish I-95 as an alternative fuels highway along the Northeast Corridor.
- NJDEP and PADER should examine ways of retiring or minimizing the use of automobiles built before 1980, which emit hydrocarbons at much higher rates than newer vehicles.

Congress should increase the relative cost of new vehicles which emit the most pollutants and decrease the cost of cleaner vehicles through a *feebate* program which provides a surcharge on more polluting cars and a bonus or tax break on more efficient vehicles. Each state should also consider a feebate program.

# Increase the effectiveness of measures such as Enhanced Inspection and

*Maintenance*—In addition to the benefits derived from transportation control measures which alter the transportation infrastructure and/or the costs of travel, other measures such as vehicle inspection and maintenance programs should be strengthened. It is important that they be carried out, particularly where they represent a more efficient means of improving regional air quality. Some of the steps include the following—

- States and DVRPC should support federal requirements for further improvements to the design and manufacture of motor vehicles in order to minimize emission rates.
- State inspection programs should consider additional tests such as inspection of the fuel tank and intake line and air conditioning systems for vapor and coolant leaks, respectively, in older cars.

## FREIGHT MOVEMENT

Freight movement in the region shall be supported by promoting cooperation among freight movement interests and developing an intermodal regional freight movement plan with improvements to air, highway, port and rail systems.

## Policy: Increase Level of Public and Private Investment in Regional Freight Movement Activities

## Encourage the participation of freight interests in the joint public/private programming of transportation *improvements*—The importance of freight movement to the regional economy requires the coordination of both investment decisions and operational issues between the public and private sectors of the goods movement community. DVRPC has begun this necessary coordination by involving freight interests in the planning process through the Goods Movement Task Force (GMTF), which consists of freight shippers and haulers, public planning agencies and regional port and toll authorities. As specific freight movement projects are identified opportunities to leverage public funds with private or authority sources will be explored.

 DVRPC and GMTF should periodically perform a joint analysis of public-private partnership opportunities in the region.  State DOTs, in conjunction with DVRPC and the GMTF, should seek data to augment the Intermodal
 Management System to reflect the comprehensive needs of all freight movement activities.

## Program and integrate needed freight movement projects into the Transportation Improvement Program process—Many

projects which facilitate freight movement can be found in the TIP although they are not expressly identified as such. Some of these projects include: rail crossing hazard elimination projects; replacement or rehabilitation of weight-restricted bridges; intersection improvements which increase turning radii; and bypasses of congested town centers and business districts. In order to promote a more complete representation of freight issues in the TIP process,

 DVRPC, in consultation with the GMTF, should program freight improvement projects in the TIP.

## Policy: Create Opportunities for New and Expanded Businesses which Utilize Freight Services

*Establish a unified marketing program for existing freight systems*—The Delaware Valley possesses a diverse and extensive freight movement network. This network, and a strategic geographic location, give the region great potential to serve as a major goods distribution center. The regional network includes three Class I railroads, three commercial and 12 reliever airports, diversified maritime port facilities and a comprehensive network of highway routes suitable for trucks. The recently undertaken *high-and-wide* container initiative to extend track clearances in Pennsylvania typifies the quality of freight services available in the region. Since there is intense national competition for goods movement operations, it is necessary to market existing services and capabilities to potential markets.

To promote the region's potential as a major center of freight operations, the following strategies should be pursued—

- State and local economic development offices should develop a high-quality, multi-faceted marketing program detailing the diversity of the region's freight system and economic resources.
- Local economic development offices and the GMTF should encourage targeted marketing initiatives aimed at special niche markets.
- Local economic development offices, in consultation with the GMTF, should survey both current and potential customers to determine any deficiencies of the region's freight system.

Coordinate investments and operational planning of oversight authorities responsible for freight movement—The many factors which impact goods movement indicate the need for close coordination among the numerous organizations in the industry. The need is made more acute by increases in intermodal freight operations, in which freight is conveyed by more than one mode to its final destination. Intermodal movements require the coordination of investment decisions and operations issues among public and private sectors of the goods movement community.

To assure adequate coordination and dialogue among the many organizations within the freight movement industry, the following steps are recommended—

- DVRPC should survey members of the GMTF to examine the goods movement network in its entirety, identifying and re-enforcing the relationships between the various modes.
- Policy: Create Efficient Intermodal Freight Facilities throughout the Region

Reduce transfer time to move freight between different transportation modes— Time is a critical aspect of freight operations. Shelf-life of products can be extremely limited; and customers demand on-time delivery of commodities. Moreover, the technique of just-in-time delivery of production resources is becoming more commonplace. Maritime, truck and rail operators should work to provide efficient and rapid transfers of goods between them. To minimize transfer time to move freight between different transportation modes, the following measures should be pursued—

- State and local economic development offices and the GMTF, in cooperation with private sector interests, should identify and support all necessary facility and corridor upgrades through the public and private capital programming processes.
- Intermodal facility owners and operators should regularly examine access, labor and procedural issues to minimize turnaround times.
- State DOTs and county and municipal governments should ensure adequate directional signage, truck rest areas and other amenities near intermodal facilities. DVRPC and GMTF should provide sufficient planning support and advocacy for these improvements.

Improve data and technology sharing among public and private freight interests—Decision-makers in the goods movement industry must confront numerous issues, including global events and trends, trade agreements and an evergrowing number of key players and agencies. Maintaining the region's competitiveness under these circumstances is challenging. Cooperation through pooling resources, information and technology, is essential to maintain the region's extensive goods movement capacity.
To promote continued partnerships and information sharing in the goods movement community—

- DVRPC and GMTF should develop future scenarios of freight movement systems and identify associated infrastructure needs and regulatory issues.
- States, counties, GMTF and others in the goods movement industry should establish a public/private consortium to pool resources to identify, develop and implement useful technological innovations.
- State DOTs should centralize traffic monitoring and communications for freight movements within the region. They should also encourage the industry trend toward appropriate ITS technologies.

## MOBILITY

Personal mobility shall be enhanced through improving the access to and efficiency of the region's transportation network and ensuring the safety and security of the systems' users.

Policy: Promote Coordination and Integration of All Transportation Systems

*Establish opportunities for connections among transportation modes*—Facilitating travel within the region while reducing dependence on single-occupant vehicles requires alternatives to automobile-only or transit-only travel. Within the Delaware Valley there are numerous transit routes, both rail and bus, that offer such an alternative. Making these routes efficient to use, however, requires that they be in as direct a line between origin and destination as possible. To accomplish this, transit systems should be viewed as a network of inter-connecting major routes, fed by multiple smaller routes including individual automobiles, taxis and small private buses. In this context, the highway system functions as an integral part of the transit system.

To be effective, this view of the transit system needs to focus more attention on the nodes that serve as connecting points between the feeder system and the intersecting transit routes.

- Transit operators should evaluate local bus service in relation to the network of regional rail lines and longer distance and express bus routes and revise them to provide feeder service to designated transfer stations or stops, where practical.
- Municipalities, transit operators, civic and advocacy groups should develop and implement pedestrian/ bicycle circulation plans around major rail stations and transit corridors and integrate these nodes into adjacent bicycle network facilities where applicable.

State DOTs and counties, in consultation with relevant municipalities, should identify and construct a system of park and ride lots for carpool, vanpool or local bus services. This would include a hierarchy of regional and local lots distributed throughout the region. *Regional* lots should offer at least 100 parking spaces whereas *local* lots would offer less than 100. Both should include facilities for bicycle access and storage.

## Improve scheduling and operations to accommodate intermodal movements—

Travel from one point in the region to another by transit often requires transferring from one route to another. To promote the use of transit and reduce our dependence on single-occupant vehicles, it is important to coordinate transit routes so that connections can be made with the least amount of inconvenience to the traveler. Coordination of services and routes must address three factors: (1) locating transfer points that result in the fewest number of transfers needed to reach one's destination; (2) scheduling that insures the least amount of delay between vehicles when completing a multi-vehicle trip; and (3) providing realtime information to the traveler regarding schedules and on-time performance.

Strategies to improve scheduling and operations to accommodate intermodal movements include the following—

Transit operators should conduct assessments of on-time performance for all services. These assessments would locate points where delays recur and would provide strategies to address these conditions.

- Transit operators should construct and operate a system of Intelligent *Rider* information displays at train stations, key bus stops, transportation centers, major transfer points and major multi-route bus stops. These visual display units would identify the schedule of trips serving that location (for example, within one half hour of the current time) and the status of each (arrived, on-time, delayed, canceled, etc.). The displays could be updated electronically, by either the passage of the scheduled bus or from a system control center using cellular technology.
- Transit operators should devise policies and procedures to facilitate easy or *seamless* transferring between systems. By creating a universal transfer instrument, all transfer charges could be equalized. All operators would honor each other's transfer instruments, thus saving passengers time and expense.

## Policy: Provide System Accessibility for All Population Segments

Increase the affordable mobility options for the young, the elderly and the poor—Too often, access to the transportation system is either not available or severely limited for some segment of the population. The young, the elderly, the poor, the unemployed or underemployed may be unable to pay typical transit fares or purchase and maintain a car.

The following actions will increase affordable mobility options for the young, the elderly, the disabled and the poor—

- States, counties, municipalities and transit and paratransit operators should support the formation of jitney services in appropriate areas.
- States, counties, municipalities, employers, developers and transit operators should improve the environment for bicycling by providing paved shoulders and wider curb lanes on roads, secure bicycle parking, shower facilities and bicycle transport capabilities on transit vehicles.
- States, counties, municipalities and developers should improve the environment for pedestrians by providing pathway connections between residential communities, commercial destinations and transit stations and stops. Zoning and land development ordinances should be revised to make walking distances shorter by locating buildings next to roads and requiring that parking lots be behind buildings.
- States, transit operators and the private sector should explore farefree zones in conjunction with the creation of improvement districts. This approach, as employed in Portland, Oregon, would reduce operating costs substantially: no fare

instruments, cashiers, ticket sellers, fare machines, or turnstiles would be needed. State, local and county governments and private sector employers, businesses and developers would provide subsidies, if necessary, to replace the lost fare revenue.

Comply with the regulations of the Americans with Disabilities Act—The Americans With Disabilities Act of 1990 (ADA) is a comprehensive civil rights law which prohibits discrimination on the basis of disability in employment, state and local government services, public accommodations, transportation and telecommunications. Titles II and III of the ADA require a broad variety of buildings, facilities and vehicles to be accessible to individuals with disabilities. Title II requires, among other things, that newly constructed and altered buildings and facilities used by state and local government agencies and publicly operated bus and rail systems be accessible to individuals with disabilities. Title III requires, among other things, that newly constructed and altered restaurants, hotels, theaters, shopping centers and malls, retail stores, parks, private schools, day care centers, other similar places of public accommodation, commercial facilities (non-residential facilities affecting commerce) and privately operated public transportation services be accessible to individuals with disabilities.

The following actions should be taken to comply with the regulations of ADA to provide transportation system accessibility for all population segments—

State DOTs, counties and municipalities should improve the accessibility of roads, streets, bridges and sidewalks for disabled persons in conjunction with facility repair operations, or as otherwise allowable. Sidewalks and curb cuts should be provided in developed areas and roadside emergency telephones, rest areas and park and ride lots should be accessible to disabled persons. Pedestrian traffic signals should be usable by persons with a vision handicap.

## Policy: Ensure Safety and Security of Highway and Transit Users

Reduce the number of accidents and fatalities which occur on highways and transit systems-Measures to improve highway safety (including that of transit vehicles which operate on public streets) need to address the three principal components of driver, highway and vehicle. Each contributes to accidents and can be improved. Trains and other fixed guideway vehicles, which generally run on segregated rights-of-way, have different requirements: Reliable signaling and communications are essential for safe operation, especially at high speeds or with short time periods between scheduled vehicles.

Strategies to reduce accidents include the following—

- State and local law enforcement agencies should provide toll-free cellular and CB monitoring for highway users who wish to anonymously report accidents, reckless driving and unsafe highway conditions.
- State offices for highway safety, local media and private organizations such as auto clubs should educate the driving population through ongoing public service announcements, thereby improving driving behavior and reducing improper vehicle maintenance.
- State licensing bureaus and police departments should prevent continued licensing of unsafe commercial drivers. Careful licensing procedures should be combined with procedures to detect drug and alcohol abuse.
- States should strengthen vehicle safety inspection programs.
- State licensing bureaus should periodically test all drivers and provide for more frequent testing of older drivers.
- State governments should pursue legislation to require insurance companies to provide reduced rates for drivers who voluntarily take safe driving courses and who retest their skills when renewing their driver's license.

## Reduce transit-related crime

*rate*—Although the incidence of serious crime within transit systems is fairly low, non-violent acts, minor annoyances and assaults on the senses are not. The perception of personal risk pervades parts of the system, especially during evening and night. In order to preserve or expand the market for public transportation, operators must have effective programs to ensure the personal security of passengers, who will choose other modes unless they feel safe while using the system.

Strategies to reduce crime and improve security include the following—

- AMTRAK should repair/install centerline fencing at all stations to prevent passengers from crossing tracks.
- SEPTA and NJ TRANSIT should secure rail rights-of-way on commuter rail lines through the use of fences, electronic gates and security systems.
- NJ TRANSIT and SEPTA should install closed-circuit television monitors with available voice communications in unattended rail and transit stations. Such devices can act as a strong deterrent to crime.
- Transit operators should increase the presence of uniformed police in stations and aboard vehicles during late evening hours. Their presence has been proven to lower crime and other incidents and reassures passengers using the system.

Municipalities, transit operators and developers should work toward compatible mixes of activities around transit stations through the sale or lease of development rights and other means. Compatible activities would add to the security of the transit systems by maximizing pedestrian traffic near the stations during their regular hours of operation.

Increase public awareness of security programs—Security programs work best when the public has an understanding of how they work, who administers them, how to gain access when emergencies arise and that responses can be expected.

Steps that can be taken to improve the effectiveness of security programs include the following—

- Transit operators should ensure that emergency telephones are available at all rail and transit stations and that trains, buses and trolleys are equipped with telecommunication equipment that uses silent alarms and can transmit the vehicle's location. They should also provide the means to allow passengers to communicate directly with the driver on multi-car trains.
- State DOTs, transit operators and toll authorities where applicable should ensure that all park and ride facilities have adequate lighting and telephones for emergency use. Video monitors can also be used at high crime locations or where sight distances are restricted.

State DOTs and toll authorities should install and monitor roadside emergency telephones at regular intervals along limited access highways. Such telephones are common along toll roads, but less often seen along other highways where the distance to the next interchange may be large and access to local land use restricted.

## AVIATION

This section encompasses major policy recommendations for public use airports. These policies have been reproduced from the *Year 2020 Regional Airport System Plan* which offers a more comprehensive examination of airport system needs. The reader is referred to this document for more detailed information.

 Regional support should be obtained in the federal government for prompt FAA participation in the Runway 8-26 addition at Philadelphia International Airport.

- Public acquisition of privately-owned airports which either provide critical ground access coverage in suburban areas or represent additional FAA reliever facilities should be considered.
- Storage capacity—ramp space and hangars—and runway lengths should be expanded at selected airports to accommodate business aircraft needs.
- Separation of the Federal Aviation Trust Fund grants from competition with surface transportation should be preserved.
- NAVAIDS and precision approach capabilities should be enhanced where needed for business aircraft.
- Additional heliport capacity in area CBDs should be pursued to supplement existing capacity at Philadelphia International Airport.
- Municipal zoning protection should be pursued throughout the region to minimize residential encroachment on remaining airports.

## VII MAJOR PROGRAMS, PROJECTS AND STUDIES

The end product of the analysis of the various travel corridors of the region and their interconnections is a series of detailed transportation improvement recommendations. These programs and projects were developed concurrently with related land use recommendations in response to identified needs particular to each corridor. The improvements are complementary; that is, they are corridorspecific solutions which optimize the overall movement of people and goods. When implemented in combination with the policies set forth in the previous chapter, they provide a unified approach to dealing with needs throughout the region. In some instances, the nature of the improvements are detailed sufficiently to assess the air quality and other benefits of their implementation. In other cases, no assumptions can be made which will permit an air quality analysis. The list of recommended studies at the end of this chapter results from the identification of needed improvements that fall into the latter category. In making this distinction it is recognized that individual projects are subject to detailed study of alternative improvement strategies and possible environmental impacts prior to advancement.

## **REGIONALLY SIGNIFICANT PROGRAMS**

With the era of building new highways to solve traffic problems now passing, the Delaware Valley must manage its existing transportation assets wisely through comprehensive maintenance programs, the use of new technologies and better management programs. The federal government, which traditionally funds 80 to 90 percent of new highway construction and highway widening projects, now emphasizes transportation solutions involving transit and other techniques for better *overall* system management.

#### System Preservation

If the region's highway and transit facilities are allowed to deteriorate, they will not be able to provide the capacity and performance for which they were designed. Many of the Delaware Valley's facilities require repair, rehabilitation and restoration because they have exceeded their useful design lives. Therefore, a significant emphasis of the plan must be to improve the condition of the existing highway and transit systems.

The region therefore needs to actively pursue repair, rehabilitation and restoration of its deteriorating transportation systems. In order to accomplish this program in conjunction with more extensive reconstruction and replacement projects, it is imperative that the region allocate a larger share of its financial resources to maintenance and reconstruction efforts.

#### Intelligent Transportation Systems

Strategies that will help the Delaware Valley to enhance the efficiency of the highway network through advanced technological communication systems are called Intelligent Transportation Systems (ITS). Various forms of this technology include roadway sensors to monitor traffic flow, closed-circuit TV cameras, changeable message signs, highway advisory radio, electronic toll collection systems and vehicle navigation systems. Examples of programs in the region which make use of these emerging technologies include PennDOT's Transportation Incident Management System (TIMS) program and elements of NJ DOT's MAGIC program which gather and distribute timely information on highway performance for the purpose of incident management.

Other ITS technologies can make transit more efficient and passenger-friendly. Examples of transit-focused ITS include cellular vehicle tracking systems, which can give information on actual times of transit vehicle arrivals and departures, and comprehensive fare collection, which uses a single farecard to pay for all aspects of a transit ride, including tolls, parking and transfers. These ITS technologies make transit more effective in reducing the demand for automobile travel by increasing transit reliability, performance and ease of use. An example of a program which makes use of emerging transit ITS technology is the City of Philadelphia's Transit First program. This program installs new traffic control equipment which preempts traffic signal timings for transit vehicles.

Clearly, it is in the interest of the region to pursue the coordinated implementation of relevant technological innovations in the solution of transportation problems. In addition to the policy guidance from the previous chapter, it is recommended that the region pursue a program of coordinated implementation of ITS technologies within the development of the Congestion Management System (CMS) for the region. It is further recommended that all evaluations for candidate transportation improvement projects consider the potential use of ITS and other

## Travel Demand Management

new technologies.

Moving People & Goods encourages several types of strategies that are aimed at improving mobility and managing the performance of the Delaware Valley's transportation assets. Strategies that seek to improve mobility by regulating the demand for travel are referred to as Travel Demand Management (TDM) strategies. These actions foster increased efficiency of the transportation system by influencing employee travel behavior by mode, time, frequency, trip length or route.

TDM actions may be grouped into three categories: Those that reduce the number or length of trips, those that shift trips to more efficient ways of travel (e.g., carpools, vanpools and transit), and those that shift trips to off-peak hours or uncongested routes. There are numerous types of TDM strategies to be employed in the region. Some strategies appear as policies in the previous chapter and others as projects below. Different types of TDM strategies in the region's TDM program include the following:

**Ridesharing** Using address and work commute information provided by local

employers and/or employees, commuters are matched with others making similar work trips. Transportation alternatives include public transit, vanpools and carpools.

**Park and Ride Lots** Used as a common meeting spot, these are areas dedicated for use by commuters to park vehicles while using public transit or participating in carpools or vanpools.

**Parking Management/Pricing** This is another way to discourage the proliferation of commuters driving alone to work by treating parking as a benefit, not a privilege. Proven methods of parking management include charging a small fee for parking if its currently free, offering prime spaces to regular carpools and vanpools, and even "renting" spaces to other businesses in the area.

**Bicycle/Pedestrian Facilities** To encourage employees who are able to walk or bike to work, employers would see to the provision of features such as bike racks, showers and lockers. Many employers are also involved in planning (and funding) bike and walking trails on or near their work sites.

**Guaranteed Ride Home** In order for any ridesharing or alternative commute program to be attractive to employees, there must be a sense of security that participating employees can leave the office for an emergency even when they do not have a personal vehicle on site. These strategies usually entail contracting with a rental car, taxi or vanpool service to provide transportation on an as-needed basis to cover these instances, although company vehicles can also be used. A regional or other broadly based geographical program tends to be more cost-effective for participating employers.

Staggered Work Hours (Flextime) This strategy allows employees to set their own start and end times, under guidelines established by the company, to accommodate ridesharing and public transit schedules. For example, official office hours may be 8:30 a.m. to 5:00 p.m., but employees may be allowed to arrive from 7:30 to 9:00 a.m. and leave between 4:00 and 5:30 p.m., respectively. In most cases, employees can not flex their schedules on a daily basis, but must make a long term commitment to a regular schedule.

**Compressed Work Week** This option allows some employees to condense the hours they work into fewer days, thereby increasing the length of the work day, but decreasing the amount of days spent at the work site. The most popular programs are 4/40 (i.e., four days of ten hours each) and 3/36 (three days of 12 hours each).

**Telecommuting** An alternative to physical commuting, this option allows employees to work from home via computer, modem and fax. Companies must determine which employees are eligible and how frequently they can employ this option (e.g., several full days a week or a few hours each day).

### Public Relations and Education A

complete, targeted effort must be made to increase awareness of the various options available and their potential effects on traffic, air quality and local economies. These efforts should reach employers, employees, local residents and government officials.

## **REGIONALLY SIGNIFICANT PROJECTS**

Regionally significant projects are grouped in this chapter by type of improvement, time period of implementation and by state. The definition of regionally *significant improvement* is a function of the nature and magnitude of the improvement as well as the size of the identified need. As such, individual projects which represent unique circumstances need to be scrutinized for specific mention in *Moving* People and Goods. The following table provides general guidance with respect to this definition for certain types of improvements. It is recognized that a broad spectrum of additional types of improvements are routinely necessary that are not considered regionally significant. While such projects are not treated individually in this document, factored costs are assumed in the financial feasibility assessment to insure their completion as directed by the policies of the plan.

#### **Guidance for Regional Significance**

<u>Generally considered Regionally</u> <u>Significant</u>

- New/expanded park & ride lots
- New/relocated interchange ramps

- Signal system coordination
- Corridor specific signal system improvements
- Access management programs
- Electronic toll collection
- Congestion pricing/toll structure
- MIS analyses

## <u>Generally considered Not Regionally</u> <u>Significant</u>

- Transportation Centers without new connections to rail or new parking
- Bridge replacement
- Signing programs
- Preserving rights-of-way
- Intersection improvements
- Station car programs
- Incident management
- Enforcement measures
- Ordinances
- SOVCAP analyses
- Increased existing bus service
- New/expanded bus service

The improvement type categories, defined in the text, include: new corridor facilities and services, improved corridor facilities and services, improved transportation connections and systemwide improvements. A more complete listing of the regionally significant projects can be found in Appendix B. This listing includes examples of the systemwide improvements used to determine the net effect of these projects on regional air quality. It is recognized that substitute projects for those listed in this appendix and additional improvements of each type in the systemwide category will evolve in response to the region's ever changing needs.

The time period categories signify that projects are anticipated to be completed either before 2005 or between 2005 and 2020. These preliminary assumptions recognize the fluid nature of individual project development and implementation. The timeline is anticipated to be revised with each plan update to reflect more complete knowledge of each project. The year 2005 contains added significance in that shorter term projects are included in the year 2005 build alternative for air quality modeling. The distinction between short and long term projects considered many factors such as need, implementability, and comments from state and local officials.

Map 3 in Appendix A depicts the major, non-aviation related, transportation projects to be completed between 1995 and 2005. Map 4 similarly depicts projects to be completed between 2005 and 2020. Additional detailing of the aviation-related projects can be found in the *Year 2020 Regional Airport System Plan*.

## New Corridor Facilities and Services

These improvements represent added opportunities to travel across or beyond the limits of the region by various travel modes. They may include new or reinstituted subway or commuter rail service, or new highways on new alignment. These improvements may be missing links needed to allow for the uninterrupted use of the transportation network. Additionally, they may become warranted where existing facilities can not accommodate long range demand through other means, including efforts to manage that demand.

#### Between 1995 and 2005

#### New Jersey

- 1 Burlington-Gloucester Transit Lines Center City to Mt. Holly and Glassboro
- 2 NJ 92 (Hightstown Bypass) NJ 33 to CR 571

## Pennsylvania

- 3 Newtown Rail Line Service Philadelphia to Newtown
- 4 PA 63 (Woodhaven Road Extension) US 1 to Philmont Avenue
- 5 Phila. Intl. Airport Commuter Runway Philadelphia and Delaware Counties
- 6 R3 Regional Rail Line Restoration Elwyn to Wawa

#### Between 2005 and 2020

#### Pennsylvania

7 US 202 Realignment Montgomeryville to PA 611 Bypass

### Improved Corridor Facilities and Services

These improvements represent major modifications to existing transportation facilities to accommodate anticipated demand. They may include demand management strategies, new transit service, ridesharing, or the widening of roadway. It is entirely likely that various types of improvements may be used in combination to optimize travel conditions in the corridor in question. Candidate improvement strategies to be considered in the alternatives analysis for individual projects, however, should not be restricted to these types of improvements.

## Between 1995 and 2005

#### New Jersey

- 8 CR 636 (Creek Road) CR 613 to Moorestown-Centerton Road
- 9 CR 534 (Blackwood-Clementon Road) NJ 42 to Laurel Road
- 10 CR 555 (Main Lake Road) US 40 to Cumberland County line
- 11 CR 571 (Princeton-Hightstown Road) Cranbury Road to Clarksville Road
- 12 CR 689 (Berlin-Cross Keys Road) NJ 47 to US 30
- 13 Deptford Center Road Connection to Almonesson Road
- 14 NJ 42 (North-South Freeway) NJ 41 to I-295
- 15 US 1 (Brunswick Pike) CR 533 to Alexander Road

#### Pennsylvania

- 16 Allendale Road Wills Boulevard to Crossfield Road
- 17 Blair Mill Road County Line Road to PA 63
- 18 Chestnut St Transitway Reconstruction 6th Street to 22nd Street
- 19 County Line Road Buck Road to New Road
- 20 Dresher Road PA 463 to PA 63
- 21 I-95 Intermodal Mobility Project New Jersey line to Delaware line
- 22 Market-Frankford Reconstruction/New Cars Bridge Street to 69th Street
- 23 North Philadelphia Light Rail Transit Routes 15, 23 and 56
- 24 PA 63 (Welsh Road) Tennis Avenue to Kimball Avenue
- 25 PA 291 (2nd Street/4th Street) Ridley Creek to Trainer Borough
- 26 PA 413 (New Rodgers Road) US 13 to north of Ford Road
- 27 PA 611 (Easton Road) Blair Mill Road to I-276

- 28 Sumneytown Pike South Broad Street to West Point Pike
- 29 Swedesford Road Drummers Lane to Warner Road
- 30 US 1 (Baltimore Pike) Kennett Square Bypass to Media Bypass
- 31 US 202 Delaware line to I-76
- 32 US 202 (Dekalb Pike) Johnson Highway to Montgomeryville
- 33 US 322 (Conchester Road) US 202 to PA 452

#### Between 2005 and 2020

### New Jersey

- 34 CR 536 Spur (Williamstown-New Freedom) NJ 42 to CR 706
- 35 CR 706 (New Brooklyn-Blackwood Rd.) CR 536 Spur to CR 689
- 36 Kuser Road Connection to Robbinsville Road
- 37 NJ 70 (Marlton Pike) East of Marlton to Medford
- 38 US 130 (Bordentown-Burlington Road) Wood Street to US 206
- 39 US 322 (Swedesboro-Bridgeport Road) US 130 to New Jersey Turnpike

## Pennsylvania

- 40 County Line Road PA 309 to PA 611
- 41 Germantown Pike PA 363 to North Wales Road
- 42 Henderson Road South Gulph Road to US 202
- 43 PA 63 (Welsh Road) US 202 to North Wales Road
- 44 PA 100 (Pottstown Pike) US 30 to PA 401
- 45 US 30 (Lincoln Highway) US 202 to Whitford Road
- 46 West Trenton Avenue Delaware River to US 1

## Improved Transportation Connections

Improving travel along the corridors through new or upgraded facilities can accentuate the need to provide new and/or improved access opportunities to these facilities. These types of improvements address missing and bottleneck highway and transit access locations. New facilities may include highway interchanges, train stations, transportation centers (which connect travel modes) and similar features. Improved facilities include major parking lot expansions, station relocations for new intermodal connections, and other modifications.

## Between 1995 and 2005

### New Jersey

- 47 Burlington City Transportation Center Broad Street and High Street
- 48 Cherry Hill Mall Transportation Center NJ 38 and Haddonfield Road
- 49 Hamilton Transit Complex I-295 and Northeast Rail Corridor
- 50 Moorestown Mall Transportation Center NJ 38 and Lenola Road

## Pennsylvania

- 51 Bensalem Transportation Center Station Avenue near Bristol Pike
- 52 Chester Transportation Center Avenue of the States and 6th Street
- 53 FastShip Terminal Delaware River at Terminal Site
- 54 Frankford Terminal Frankford Avenue and Bridge Street
- 55 I-95 Connection with Aramingo and Torresdale Avenues I-95 at Betsy Ross Bridge Interchange
- 56 I-95/PA Turnpike Interchange I-95 at I-276
- 57 King of Prussia Transportation Center

US 202 and North Gulph Road

- 58 Lansdale Transportation Center Main Street and Green Street
- 59 North Philadelphia Trans. Center Broad Street and Glenwood Avenue
- 60 Paoli Transportation Center R5 Regional Rail line at old Paoli yard
- 61 Radnor Transportation Center King of Prussia Rd. and Matsonford Rd.
- 62 Thorndale Train Station US 30 Business near PA 340
- 63 West Chester Transportation Center Market Street and Matlack Street
- 64 Woodbourne Transportation Center Woodbourne Road at Railroad Crossing

#### Between 2005 and 2020

## New Jersey

65 Atlantic City Expressway Interchange at CR 689 (Cross Keys Road)

## Pennsylvania

- 66 Market West Subway Station Market Street and 21st Street
- 67 Media Transportation Center Orange Street and Media Station Road
- 68 Neshaminy Mall Transportation Center US 1 and Rockhill Drive
- 69 Overbrook Transportation Center City Avenue and 63rd Street

## Systemwide Improvements

Additional improvements need to be made throughout the region to enhance the performance of the transportation system. In some cases, deficiencies exist due to the age or the incomplete nature of the system. In other cases, facilities or services have been overtaxed beyond their original intended use and need to be improved. In still other instances, new features or services are required to redirect

#### MAJOR PROGRAMS, PROJECTS AND STUDIES

the demand for use of the facility or service. Examples of improvements in this last category include carpool/vanpool staging and bicycle/ pedestrian features.

Improvements anticipated in the plan have been divided into nine categories. Specific improvements assumed in determining the impacts of the plan are detailed in Appendix B along with further detail regarding the previously mentioned projects.

## Types of Additional Improvements

- Reconstruction of Major Facilities
- Transit Facilities, Vehicles and Services
- Bicycle and Pedestrian
- Park and Ride Lots
- Ramp Construction

- Advanced Signal Systems and Signing
- Intersections and Spot Locations
  - Access Controls
  - Congestion Management Systems

## **RECOMMENDED STUDIES**

In some instances, the nature of the improvement designed to meet an identified transportation need cannot be stated in sufficient detail to warrant incorporation as a project in the plan. In other cases, the plan proposes a specific transportation improvement, even though it may be modified in the future. This is done both to evaluate the cumulative



I-476 in Delaware County

effects of all improvements and to give citizens a better overall understanding of the region's total transportation vision.

Planning studies are required for these locations to determine an optimal approach. In addition, ISTEA requires that a major investment study (MIS) be completed by the metropolitan planning organization before a major highway or transit project can receive federal funds. Within the list below, study corridors and areas currently undergoing MISs are denoted by **boldface**.

As these studies are completed and projects become identified, they will be included in future updates of *Moving People and Goods*. At present, no funds are identified in the financial plan portion of this document to provide for the implementation of any of these potential transportation improvements.  $\Box$ 

### **Major Study Corridors and Areas**

- S1 Burlington-Gloucester Transit Lines Center City to Mt. Holly and Glassboro
- S2 Cross County Transit Line Glenloch to Trenton
- S3 Exton Area Transportation Study US 30 and PA 100
- S4 52nd Street Station Restoration R5 Regional Rail Line at 52nd Street
- S5 Hatfield Area Transportation Study PA 9 to PA 309
- S6 I-476 (Mid-County Expressway) I-276 to I-95
- S7 I-95 Intermodal Mobility Project New Jersey line to Delaware line
- S8 I-95/I-276 Interchange
- S9 I-276 (Pennsylvania Turnpike) I-76 to Norristown Interchange
- S10 Northeast Philadelphia Public Transit Study, including:

- Northeast Metro Transit Line Center City to Fox Chase/Byberry via western corridor

- Northeast Rapid Transit Line Center City to Byberry via central corridor

- S11 NJ 92 (Hightstown Bypass) NJ 33 to CR 571
- S12 NJ Turnpike Delaware Memorial Bridge to Exit 4
- S13 PA 41 Delaware line to PA 926
- S14 PA 63 (Woodhaven Rd. Extension) US 1 to Philmont Avenue
- S15 PATCO Extension 16th to 21st/30th Street
- S16 Pennsylvania Turnpike-Northeast Extension Interchange Study Norristown to Quakertown Interchanges
- S17 Philadelphia Zoo Station Rail lines adjoining Zoo property
- S18 Phoenixville Area Transportation Study US 422 to PA 724
- S19 Quakertown Area Needs Study PA 663 in vicinity of Quakertown
- S20 Regional High Occupancy Vehicle (HOV) Network Study
- S21 Regional Rights-of-Way Preservation Study
- S22 R3 Service Extension Wawa to West Chester
- S23 SEPTA Regional Rail Division Improvement Study
- S24 Schuylkill River Corridor Study Pottstown to Center City, including:
  I-76 (Schuylkill Expressway)
  I-276 to I-476
  King of Prussia Rail Connection
  - Norristown High Speed Line to Shopping Mall
  - Schuylkill Valley Metro
  - Norristown to Pottstown
  - US 422 (County Line Expressway) US 202 to PA 363
- S25 US 322 NJ Turnpike to NJ 42
- S26 US 202 Realignment Montgomeryville to PA 611 Bypass
- S27 US 202 Delaware line to I-76

## VIII FINANCIAL PLAN

#### BACKGROUND

Moving People and Goods was prepared within prescribed metropolitan planning guidelines. Two of the most significant federal requirements impacting regional long range plans are that they be (1) financially constrained, and (2) demonstrate conformity with federal air quality guidelines.

With respect to the financial constraint, federal law specifically states that long range plans must include a financial element that demonstrates the consistency of proposed transportation investments with known and projected sources of revenue. The financial element must indicate resources from both public and private sources that are currently available or reasonably expected to be available for transportation uses over the period of the plan, as well as recommend innovative financing techniques for those resources not currently available.

## FINANCIAL CONSTRAINT

The financial planning element of *Moving People and Goods* fulfills a new ISTEA requirement by preparing revenue estimates for existing and proposed funding sources and comparing them with the estimated costs of the various transportation improvements necessary to maintain, improve, and operate the regional transportation system. The financial planning element assesses the capital investments and financing strategies necessary to:

- (1) ensure the preservation of the existing metropolitan transportation system, including requirements for operational improvements, resurfacing, restoration, and rehabilitation of existing and future major roadways, as well as operations, maintenance, modernization, and rehabilitation of existing and future transit facilities,
- (2) make the most efficient use of existing transportation facilities to relieve congestion and maximize the mobility of people and goods, and
- (3) contribute to the attainment of the national ambient air quality standards set forth in the Clean Air Act.

The financial planning element has four components. The first provides an overview of traditional federal, state, regional, and local funding sources. Building on this review, the second component presents a comprehensive survey of potential new sources of revenue. This is the first time that innovative funding sources have been included in the region's long range transportation plan. The costs of the projects and programs to be included in the plan are then estimated and summarized in the third portion. Estimates of anticipated revenues from the traditional funding sources are set forth and compared to projected project and program costs in the fourth section of the financial planning element.

# Available Resources—Traditional Sources of Funding

## Federal Funding Sources

A major source of funds for capital improvements to the transportation system is the federal government. Typically, Congress passes legislation authorizing the federal government to establish funding programs for surface transportation every six years. The current act, the Intermodal Surface Transportation Efficiency Act (ISTEA), was signed into law in December 1991. This Act provides funding authorizations totalling \$155 billion nationwide for highways and mass transportation for FY 1992-1997.

The Highway Trust Fund, which is the source of funding for most of the federal programs outlined below, was extended to the end of FY 1999 under ISTEA. The Highway Trust Fund is divided into a Highway Account and a Mass Transit Account. These accounts receive their funding primarily from the federal taxes on motor fuels. Currently the tax rate for gasoline and special fuels is 14 cents per gallon (2.5 cents goes toward deficit reduction) and 19.5 cents on diesel fuel. ISTEA directs \$122 billion from the Highway Trust Fund into the Highway Account, \$18 billion into the Mass Transit Account. An additional \$15 billion from the General Fund of the U.S. Treasury is anticipated for mass transit.

Authorization acts only establish the program authority and upper limits of funding over the life of the act. Congress must follow up each year with a separate appropriation act to fund these programs. Often, the appropriated amount is lower than the authorized amount. This is particularly true for funding from the General Fund for mass transit. For purposes of financial planning, states and MPOs are permitted to assume authorized funding levels.

Federal Highway Programs: Federal assistance for highway programs is apportioned to the states and administered by the Federal Highway Administration (FHWA). ISTEA restructured previous highway programs which had been directed primarily toward the construction and improvement of four federal-aid systems: Interstate, Primary, Secondary, and Urban. This structure was replaced with the National Highway System (NHS), which includes the Interstate system and additional routes of national interest; a Bridge Program; and two new block grant type programs-the Surface Transportation Program (STP) and the Congestion Mitigation and Air Quality Improvement Program (CMAQ). The STP is available for all roads not functionally classified as local or rural minor collectors. CMAQ funds are available for transportation projects that help attain the national air quality standards in areas designated as nonattainment for ozone and carbon monoxide by the Clean Air Act.

ISTEA provides state and local governments more flexibility in determining transportation solutions by permitting certain categories of federal funds to be used for either transit or highway capital expenses. Generally, federal aid programs require a minimum 20 percent local match with the exception of interstate construction and maintenance which requires a 10 percent match.

The *Interstate System*, although part of the NHS, will receive separate funding totaling \$7.2 billion nationwide to allow for its completion and \$960 million for Interstate Substitution Projects. Once all remaining segments of the Interstate system are completed, the Interstate Construction and Interstate Substitution categories will no longer be available. Therefore, DVRPC has combined these funds with the NHS category for purposes of projecting resources for the plan.

Funds from the *Interstate Maintenance* program may be used for rehabilitation, restoration and resurfacing of the Interstate system. Interstate Maintenance funds are distributed based upon lane miles and vehicle miles travelled on the Interstate facilities. Pennsylvania receives approximately \$71 million annually in Interstate Maintenance funds while New Jersey receives about \$31 million.

In the DVRPC region, the National Highway System (NHS) consists of major roads, including all interstate routes, a large percentage of urban and rural principal arterials, and other strategic highway connectors, for a total of 1,290 miles of highway (155,000 miles nationwide). The NHS funding level nationwide is \$21 billion for the six years of ISTEA (an average of \$3.5 billion per year) and funds are distributed to states in the same way as for the Surface Transportation Program (STP) outlined below. Up to 50 percent of NHS funds may be transferred to the STP program by the state. Pennsylvania receives about

\$329 million annually in combined NHS and Interstate funds while New Jersey receives \$160 million.

The Surface Transportation Program (STP) is a new block grant program that may be used by the states and localities for a wide variety of projects, except on roads that are functionally classified as local or rural minor collectors. These funds are not restricted to federal aid roads and may be used for bridge projects. Transit capital projects are also eligible under this program as are travel demand management, marketing, and planning programs. The total national funding for STP over the six years of ISTEA is \$23.9 billion, or an average of \$3.98 billion per year. The formula for distributing these funds to the states is based upon each state's FY 1987-1991 share of total national funding, excluding apportionments for Interstate Maintenance and Bridge programs. Once these funds are distributed to the states, each must set aside 10 percent for safety projects and 10 percent for transportation enhancements. The State must divide 50 percent of the funds between each of its areas over 200,000 in population and the remaining areas of the State. The last 30 percent can be used anywhere in the state. Pennsylvania receives \$199 million annually in STP funds and New Jersey receives \$120 million.

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) provides funding for transportation projects or programs that will contribute to the attainment of the national ambient air quality standards in Clean Air Act nonattainment areas for ozone and carbon monoxide. Total ISTEA funding for this program nationally is \$6 billion, or an average of \$1 billion per year. The funds are distributed based on each state's share of the population in air quality nonattainment areas weighted by degree of air pollution. Pennsylvania and New Jersey receive \$60 million and \$55 million per year, respectively.

#### The Bridge Replacement and

Rehabilitation Program provides federal funding assistance for any bridge on a public road. Total funding through ISTEA for this program is \$16.1 billion nationwide, or \$2.7 billion per year. Forty percent of a state's bridge funds may be transferred to the NHS or the STP. Both Pennsylvania and New Jersey have taken advantage of this transfer provision. Pennsylvania receives \$242 million annually while New Jersey receives \$88.5 million.

Federal Public Transit Programs: Federal funds for public transit are distributed to metropolitan regions rather than to the states. Funds are administered by the Federal Transit Administration (FTA). The funds are apportioned to regions both through legislative formula and on a competitive (FTA discretionary) basis. The public transit formula and discretionary programs requirements under ISTEA remain basically unchanged from previous law. The formula grant programs are Section 9, 16, 18, and Section 3A Rail Modernization (a new feature of ISTEA). Section 3B New Starts and Section 3C Bus remain discretionary programs. ISTEA has changed the matching requirements for transit capital projects, setting it at a minimum of 20

percent, which is identical to most highway program matching requirements.

A total of \$31.5 billion is authorized for public transit projects over the six-year period of ISTEA. Funding for public transit under ISTEA is proposed to increase substantially in the last year of ISTEA. However, over 40 percent of this funding must come from the general treasury funds appropriated annually by Congress. Listed below is a brief narrative on the various Federal Transit programs and an indication of the average annual funding to be received.

The Section 3 Discretionary and Formula Capital Program provides funding for upgrading existing rail lines, building new fixed guideways (rail lines, busways, etc.), and other transit capital projects. The total ISTEA funding authorization is \$12.4 billion for the six years of ISTEA. There are three components to the Section 3 program. Funds are divided as follows: 40 percent for Section 3A Rail Modernization; 40 percent for Section 3B New Starts; and 20 percent for Section 3C Bus and other transit projects. Authorization for Rail Modernization is \$5 billion over the six years. These funds are allocated to regions by formula rather than on a discretionary basis and this region anticipates receiving \$108 million annually in Section 3A Rail Modernization funds. Federal authorization for New Starts also totals \$5 billion. A substantial number of New Starts projects are earmarked in the ISTEA and thus funding is limited for other new starts. Authorization for Section 3C Bus and other projects totals \$2.5 billion over the six years of ISTEA. These funds are granted based upon

discretionary criteria and are available competitively nationwide.

The Section 9 Formula Grant Program provides funds on the basis of a statutory formula to all urbanized areas in the country. The program is authorized at \$16.1 billion for the six years of ISTEA. Funding under this program increases during the last year of the program. Section 9 funds can be utilized for both capital and operating costs. Use of the funds for operating costs are limited by statute. Section 9 funding estimated to be available to the region annually is \$96 million, with capital funds at approximately \$62 million and operating funds limited to \$34 million.

Section 16 provides funding for transportation services for elderly and disabled persons. Funds may go to private, non-profit organizations or to public bodies for capital costs or for capital costs of contracting for services. The program authorization is \$428 million nationwide for the six year period of ISTEA. Funds are allocated to states based upon statutory requirements and are provided to the applicants.

The *Section 18 Program* provides funds for transit service in rural areas. These funds are allocated to rural areas in states based on a statutory formula. The program is funded nationally at \$937 million for the six years of ISTEA. This region anticipates receiving approximately \$330 thousand annually.

*Federal Goods Movement Programs:* Prior to ISTEA, federal assistance for goods movement programs in the region was

primarily administered through the Federal Railroad Administration (FRA). The FRA provides discretionary federal funding to the states for eligible capital improvements to facilitate the movement of goods. FRA grants to the region have decreased in value over the years. It should be noted that state funding sources provide financial support for railroad improvements that are not federally eligible. FRA funds are not accounted for in the resources available to the region.

In addition to goods movement by rail, the region also moves goods through airports and the river ports located on both sides of the Delaware River. There are no ongoing federal programs to improve the ports, other than the opportunities established through ISTEA for land-side improvements.

Federal Aviation Funds: Traditionally, FAA has funded airport improvements through the Federal Aviation Trust Fund. This fund has provided 75% of eligible project costs at Philadelphia International Airport (PHL) (including safety and capacity projects but not terminal improvements) and 90% of eligible safety and capacity projects at all other eligible airports. One third of the federal funds traditionally received by PHL are formula based on passenger levels, and the remaining federal funds are discretionary, therefore projects at PHL and other airports in the region must compete with projects from around the country.

Since 1992, federal annual airport funding levels have been reduced by Congress, partially in response to the institution of the locally collected Passenger Facility Charge (PFC) and also in response to deficit reduction trade-offs in Congress. With less federal dollars and more competition, fewer airports in the region will receive public capital grants in the future.

## State Funding Sources

In addition to federal funding sources, both states provide substantial levels of funding for transportation improvements. State funds are used to provide much of the 20 percent match required for most federal programs and to undertake certain projects entirely with state funding. Both states provide capital and operating assistance for highway and public transit projects. New Jersey has elected to utilize a new provision in ISTEA which allows the state to take certain credits for toll revenues reinvested in the system by its toll authorities, thereby offsetting the required 20 percent match for federal projects.

Pennsylvania: Pennsylvania Act 26 was passed in 1991 to provide a dedicated funding source for Pennsylvania's public transit systems. Act 26 funds are used for capital needs to rebuild and maintain the public transit infrastructure of the 38 transit agencies in Pennsylvania. In order to finance this legislation, the state has established the Public Transportation Assistance Fund (PTAF). This fund derives revenue from several divergent sources. The following taxes were established or increased in order to underwrite this fund: Tire Fee-a flat fee of \$1 per new highway motor vehicle tire sold; Motor Vehicle Lease Additional Tax—a 3 percent tax imposed on the total lease of a motor vehicle in addition to the

current tax; *Motor Vehicle Rental Fee*—a \$2 per day fee imposed on the rental of a motor vehicle; and *Utility Realty Additional Tax*—an addition of 12 mills per dollar to the current Utility Realty Tax levied against regional public utility companies.

Act 26 taxes generated approximately \$159 million in revenue for the PTAF in FY 1994. After set-asides of \$8 to \$9 million per year, SEPTA receives approximately 70 percent of the remaining funds. SEPTA is permitted to spend approximately 30 percent of the funds it receives for asset maintenance (operating costs). The remainder must be used for capital projects. FY 1995 revenues are estimated to be the same as for FY 1994. Act 26 also requires Bucks, Chester, Delaware, and Montgomery Counties and the City of Philadelphia to provide a match equal to one-thirtieth (1/30) of the total cost for capital projects.

The Pennsylvania Motor License Fund is a special fund composed of monies received from the Liquid Fuels and Fuel Use Taxes, driver license and vehicle registration fees, aviation revenues, federal aid for highway and aviation purposes, contributions from local subdivisions for highway projects, and miscellaneous highway revenue. The fund provides for highway and bridge improvement, design, maintenance and purchase of rights-ofway, as well as aviation activities and Department of Transportation licensing and safety activities. It also finances the State Police highway patrol operations and pays subsidies to local subdivisions for construction and maintenance of roads. The Motor License Fund generates

approximately \$1.5 billion each year. The following discussion explains the major state sources of income to the fund. The use of aviation income is restricted and therefore is not taken into consideration in this plan.

The *Liquid Fuels Tax* is based on the number of gallons of liquid fuel (primarily gasoline) used, sold or delivered within the Commonwealth. The present tax rate is 12 cents per gallon. The *Fuel Use Tax* applies to diesel fuel and any fuel not taxed under the Liquid Fuels Tax Act. It is based on the number of gallons of fuel used in the Commonwealth by dealer-users.

The Motor Carriers Road Tax is levied on motor carriers operating vehicles with a gross weight or registered gross weight in excess of 17,000 pounds. The tax is comprised of: a 12 cent per gallon tax; an oil company franchise tax element based on 115 mills of the average wholesale price of motor vehicle fuels; and a 6 cent per gallon surtax. The Motorbus Road Tax is imposed on the amount of motor fuel used by bus companies in their operations on highways within the Commonwealth. The tax contains the liquid fuels tax rate of 12 cents per gallon and an oil company franchise tax element based upon 115 mills of the average wholesale price of motor fuels. In addition to the Motor Carriers and Motorbus Road Taxes, an identification marker is required on vehicles subject to these taxes at a flat fee of \$5 per vehicle annually.

*Motor Licenses and Fees* include revenue from the collection of fees for the

registration and titling of motor vehicles and for the issuance of learners' permits, operators' licenses, certificates of title and transfers of registration.

The Oil Company Franchise Tax is an excise tax on oil companies for the privilege of exercising their corporate franchise, doing business, employing capital, owning or leasing property, maintaining an office, or having employees in the Commonwealth. The current tax rate is 115 mills on the average wholesale price of motor fuels used for motor vehicles. Part of these funds are available to the Motor License Fund on an unrestricted basis. Restricted funds are to be used as follows: 42 percent for maintenance, 17 percent for capital projects, 13 percent for bridges, 12 percent for municipalities, 14 percent for toll roads, and 2 percent for county or forestry bridges.

Other Revenues that flow to the Motor License Fund include revenues from certain fines, a Gross Receipts Tax (8 mills) on for-hire passenger or property carriers operating on routes not entirely within the Commonwealth, interest income, and sales of vehicles, property or information.

General Budget Appropriations are made annually by the Commonwealth of Pennsylvania to provide additional operating assistance to public transit providers. This operating assistance is discretionary and varies annually. SEPTA receives 70 percent of the statewide amount. In FY 1995, SEPTA will receive \$171.5 million of the \$238 million total. A 25 percent match is provided by the five Pennsylvania counties in the DVRPC region.

*New Jersey:* The *New Jersey Transportation Trust Fund (TTF)* is a special financial authority established by New Jersey to provide state funds for highway and public transit projects. The Trust Fund Account of the state's General Fund is credited with portions of funds received by the treasury from the Motor Fuel Tax, Toll Authority Payments, and certain Other Vehicle Fees and Taxes. The Trust Fund authority is established by authorizing legislation, which was renewed during 1995.

The Motor Fuel Tax applies to sales of gasoline, diesel fuel, or liquefied petroleum gas and compressed natural gas used in motor vehicles on public highways. The general rate of tax (gasoline) is 10.5 cents per gallon. Onehalf that rate (5.25 cents per gallon) is applied to petroleum gas and liquefied or compressed natural gas sold or used to propel motor vehicles on public highways. The diesel fuel rate is 13.5 cents per gallon of which 3 cents per gallon is refundable for fuel used in passenger automobiles and motor vehicles less than 5,000 pounds gross weight. In FY 1994, the Motor Fuel Tax yielded approximately \$276.5 million in TTF revenue.

Of the funds generated by the 10.5 cent gasoline tax, 2.5 cents per gallon is constitutionally dedicated to the TTF account. The TTF dedicated share of this tax will rise to 7.5 cents in 1997, 8.0 cents in 1999 and 9.0 cents in 2000. The difference remains in the state's general fund. The *Toll Authority Payments* are amounts established through periodic contracts between the state and its various toll authorities to be paid to the state from net authority income after all bond obligations are met. These payments to the TTF will total approximately \$24.5 million per year.

The Other Vehicle Fees and Taxes refers to revenues derived from increases in the motor vehicle registration fee, identification markers, and diesel fuel tax. The amount credited to the TTF shall not be less than \$30 million annually.

The TTF will provide a funding stream of \$700 million annually for transportation projects. Through the appropriation process, approximately \$130 million annually will be dedicated to county and municipal aid for transportation from the trust fund.

The TTF legislation also allows the local aid funds to be disbursed on either a grant or cost reimbursement basis; allows bond maturities of up to 20 years; permits multiyear funding agreements; and allows NJDOT to loan federal funds allocated to the state to public or private entities for transportation purposes for up to five years.

*General Appropriations* The State of New Jersey also provides operating assistance to public transit through annual budget appropriations. This operating assistance is discretionary and varies annually.

## Other Funding Sources

*Toll Authorities:* The DVRPC region is served by a number of toll authorities whose revenues are used to maintain and operate their respective facilities. Listed below is a brief summary of these authorities.

The *Pennsylvania Turnpike Commission* operates the Pennsylvania Turnpike and Northeast Extension. These two facilities traverse 475 miles in Pennsylvania of which approximately 86 miles are in the DVRPC region. Total toll revenue for these facilities was nearly \$281 million in 1994.

The *New Jersey Turnpike Authority* operates the New Jersey Turnpike which is 131 miles long. Approximately 60 miles of the Turnpike traverse the DVRPC region. The Turnpike generated slightly under \$344 million in toll revenues in 1994.

The Delaware River Port Authority (DRPA) operates the Ben Franklin Bridge, Commodore Barry Bridge, Walt Whitman Bridge, Betsy Ross Bridge, and the PATCO High Speed Line. DRPA is also responsible for port development in the Philadelphia metropolitan area. Nearly 47 million vehicles crossed the DRPA bridges in 1993 and more than 11 million passengers rode the PATCO system. DRPA's total operating revenues were over \$120 million in 1994.

The Burlington County Bridge Commission owns, operates, and maintains two Delaware River toll bridges linking New Jersey and Pennsylvania, as well as seven non-toll bridges throughout Burlington County. More than 76,000 vehicles cross the Burlington-Bristol and Tacony-Palmyra bridges every day. Revenue from the toll bridges goes toward the repair and maintenance of all bridges and approaches under the Commission's jurisdiction. Total toll revenue for the Commission was approximately \$16.4 million in FY 1994.

The *Delaware River Joint Toll Bridge Commission* operates and maintains 2 toll bridges and 7 non-toll bridges in the DVRPC region. The toll bridges connect Trenton to Morrisville via Route 1 and the New Hope area to the Lambertville area via Route 202. Revenue from the toll facilities in the DVRPC region totalled nearly \$4 million in 1994.

The South Jersey Transportation Authority operates the Atlantic City Expressway, the Atlantic City International Airport and the Atlantic County Transportation Parking garage in Atlantic City. Approximately 14 miles of the 44 mile Atlantic City Expressway are within the DVRPC region. Total revenues for the South Jersey Transportation Authority were nearly \$30 million and toll revenue from the Expressway was approximately \$24 million in 1994.

The New Jersey Highway Authority operates the Garden State Parkway which is 172 miles in length. Approximately 6 miles of the parkway traverse the DVRPC region. Toll revenue for the Garden State Parkway was approximately \$167 million in 1994. *State Aviation Funds*: Many projects at non-federally funded (privately owned non-reliever airports) are advanced with state capital subsidies, generally at a 75% share. States' funding in general is increasing.

Local Government Sources: All municipal governments are responsible for maintaining the road system under their jurisdiction. Counties in New Jersey, and to a lesser extent in Pennsylvania, also are responsible for portions of the highway system. In addition, there are instances where governments at either level own transit vehicles or property. The source of the funds used for these purposes are generally derived from local taxes. Though these expenditures are significant, DVRPC has not accounted for them in this Plan. Similarly, the local share of aviation project costs must be borne by local bond issues in the case of PHL and other publicly owned airports or by private owners where possible.

*Private Sources:* In addition to toll facilities, both states in the DVRPC region have granted municipalities, and in some cases counties, the right to impose impact fees on new development or to create special assessment districts for transportation improvements. These funds can be used to leverage federal, state or local funds or to undertake improvements without any public funding.

In the coming years, the region will need to increase the amount of funds it receives from non-traditional sources to maintain and improve the transportation system. New financing mechanisms may include congestion pricing, parking pricing, establishing highway toll districts, public/private partnerships, permitting advertising on variable message signs during off peak hours, and a variety of local option taxes. Innovative strategies to raise additional revenue for transportation improvements is the topic of the next section.

## Available Resources—Potential New Sources of Funding

ISTEA has provided for a substantial increase in authorization levels for federal transportation funding. As described in the previous section, certain new funding programs are available to the region as well as additional flexibility in the use of federal funds. However, Congress has been unable to appropriate the expected amounts of funds due to pressure to reduce the nation's budget deficit. Transportation funding at the state level has not been increasing as hoped either. State gas taxes, which form the revenue base, are not keeping pace with inflation and the states are reluctant to raise them. In addition, with ever-increasing fuel efficiency, the growth rate of the gas tax revenue base is declining.

The uncertainties of future levels of traditional funding, coupled with increasing costs to maintain and operate the transportation system and an increasing demand for transportation in the region, make it clear that new funding mechanisms must be explored. In order to ensure that the recommendations of *Moving People and Goods* can be implemented, the region must focus its attention on identifying innovative ways to raise additional

revenue, particularly at the regional/county	Charges, (2) Local Option Taxes and User
level.	Charges, (3) Benefit Sharing Strategies,
	and (4) Other Approaches. This
The following table details potential new	compilation should be viewed as a menu of
sources of funding. It is divided into four	options available to the region, and not as
categories: (1) State Taxes and User	a list of recommendations.

## Potential New Sources of Funding

Technique	Geographic Area of Applicability	Implementation Responsibility	Examples Where this Technique has been Implemented
State Taxes or User Charges			
Additional State Fuel Taxes cents per gallon increase charged at the pump	Statewide	State government	California
Index State Fuel Taxes to Inflation to prevent decrease in real dollars over time and provide a more predictable funding stream	Statewide	State government	
Change Gallon Tax to a Sales Tax Base assessed as a percentage of sales instead of on a per gallon basis, so tax revenue increases with the price of gas	Statewide	State government	
State Constitutional Amendment to Allow Gasoline Tax Funds to Be Spent on Any Transportation Mode including mass transit, bicycle, and pedestrian projects	Statewide	State government	Kansas, Maine, Montana, Nebraska, New York, Ohio, and Rhode Island allow gas tax proceeds to be spent on highways or transit
Tax on Motor Vehicle Insurance assessed as a percentage of the premium	Statewide	State government	
Additional Auto Registration Fees increase in the dollar amount per vehicle assessed annually at the time of vehicle registration	Statewide	State government	
Additional Truck Fees truck tax based on weight or on a weight & distance traveled combination in lieu of fuel taxes and progressively costly licenses	Statewide	State government	•

Technique	Geographic Area of Applicability	Implementation Responsibility	Examples Where this Technique has been Implemented
Local Option Taxes and User Charges	zana mana kakata ing dapat pangan na kata na ka		
Local Vehicle Registration Fees/Vehicle License Fees/Driver License Fees dollar amount per vehicle assessed annually at the time of vehicle registration, or a fee assessed at the time of driver's license renewal	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	Counties in Texas and in the Seattle, Washington area, additional locations
<b>Transit Fare Restructuring</b> fare increases; adjustments to the transit system's rate structure, collection, or marketing techniques	Operating area of the transit agency	Transit agency	Nationwide
Regional/County Gas Tax tax charged at the pump on a cents per gallon basis or as a percentage of sales	Limited to counties or regions within a state	County or regional government with state enabling legislation	Local jurisdictions in California, Florida, Illinois, Virginia, and Washington
Regional Tax on Vehicle Miles Traveled cents per vehicle mile traveled - mileage determined at the time of vehicle inspection	Limited to regions within a state which has a periodic inspection program	Regional government with state enabling legislation	
Parking Taxes on gross proceeds or on a per stall basis for commercial parking operators, or as a percentage of the parking fee or a flat fee for individual parkers	Limited to portions of a municipality, or whole municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	Local jurisdiction in the Seattle, Washington area
Congestion Pricing/Tolls increase tolls during peak hours or for solo drivers	Limited to designated facilities	Toll authorities	
Regional Add-On to Sales Tax percentage of taxable sales added on to the existing state sales tax	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	Philadelphia, PA; Maricopa County, AZ; San Diego County, CA and 5 counties in the San Francisco area; Atlanta, GA; Seattle, WA; and Cook County, IL
Add-On Sales Tax for Motor Vehicles percentage of motor vehicle sales added on to the existing state sales tax	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	
Regional Personal Dedicated Income Tax percentage of taxable income	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	

Technique	Geographic Area of Applicability	Implementation Responsibility	Examples Where this Technique has been Implemented
Add-On Corporate Dedicated Income Tax percentage of taxable income added on to the existing corporate income tax	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	
Additional Taxes on Cigarettes/Liquor existing tax rate increase	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	
Tax on Advertisements for Automobiles/Gasoline/Automobile-Related Products and Roadside Billboards tax proceeds to be spent on ameliorating the negative by-products of driving	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	
Add-On Utility Tax increase the existing rate of consumption tax	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	New York City
Add-On Property Tax dollar amount per \$1000 of assessed value added on to the existing property tax	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	Minneapolis/St. Paul, Minnesota; Portland, Oregon; and Washington
Local Real Estate Excise Tax percentage of the sale of real property assessed at the time of sale	Limited to municipalities, counties, or regions within a state	Municipal, county, or regional government with state enabling legislation	Washington

## Benefit Sharing Strategies

Sale or Lease of Government Property/Development Rights generate revenue through the sale or lease of property, including the air and subsurface property rights (joint development)	Site specific	Transportation agency	SEPTA, Washington Metropolitan Transportation Authority, state transportation agencies in California, Massachusetts, and Nevada
Special Transportation Assessment Districts charge assessed on commercial and/or residential property in designated areas; amount assessed based on funding formulas that determine the "fair share" given the projected use of the services or facilities by each property	Designated district	Municipal, county, or regional government with state enabling legislation	East Whiteland, Tredyffrin, and Upper Dublin Townships in Pennsylvania; Chicago, Illinois; and Seattle, Washington

Technique	Geographic Area of Applicability	Implementation Responsibility	Examples Where this Technique has been Implemented
Developer Impact Fees single payments required of developers as a condition of development approval, to be used by localities to pay the development's proportionate share of the cost of off-site public services or facilities necessitated by the new development; calculated based on the proportionate cost to mitigate the identified impacts and collected into a separate account	Limited to municipalities within a state	Local government with state enabling legislation	local jurisdictions in New Jersey and Pennsylvania; nationwide
Tax Increment Financing/Value Capture increases in property tax revenue derived from public and private investments located near a project - the amount collected over the base-year value is used to finance public improvements	Limited to municipalities within a state	Local government	Nationwide
Density Bonus Arrangements developer contributes to a transit related improvement in return for additional development rights	Limited to municipalities within a state	Local government	New York City
Other Approaches	en wy zyskie in teologisch wie de stand son de le son de stand en de stand en de stand en de stand en de stand		and a second
Legislative Earmarks language and funding for a specific project inserted into transportation authorization or appropriation bills at the federal or state level	Project specific	Federal or state legislature	Nationwide
Transfer Ownership of State-Owned Roads to Counties or Municipalities (or vice versa) along with Sufficient Gas Tax Funds to Maintain Them <i>to reduce maintenance burden</i>	Roadway specific	Municipal, county, and state government	Nationwide
Increasing Efficiency/Reducing Costs reduce costs of providing existing services by making existing system more efficient, i.e., competitively bidding highway maintenance and transit service, private development of facilities, and travel demand management	Municipality, county, region, or operating area of transportation agency	Municipal, county, or state government, or transportation agency	Nationwide

## Determination of Needs

In order to determine the adequacy of traditional resources to construct the facilities and implement the services recommended in *Moving People and* 

*Goods*, it is necessary to determine the approximate cost of these recommendations. Capital costs of facility recommendations were estimated for individual projects in the plan. Capital costs reflect the implementation of the

facility recommendations of the plan detailed in Chapter 7 and Appendix B. Major maintenance costs and additional capital costs associated with other work not detailed in *Moving People and Goods*, were based on historic precedent using equivalent costs from the current Transportation Improvement Program (TIP). Projected federal operating assistance to the region's transit operators was incorporated with this "grouped" cost.

Individual and grouped projects were first categorized by the nature of the principal benefits they are intended to provide. This was necessary in order to then assess the impact of the policy recommendations on anticipated spending levels for various types of projects. This was done through the application of adjustment factors to the initial costs of the "grouped" projects in each category. The following categories were developed: freight movement initiatives, isolated safety & environmental improvements, network reconstruction & maintenance, passenger intermodal facilities, public transit & ridesharing, roadway improvements, traffic operational improvements, transportation enhancements/amenities, travel demand management.

*Freight Movement Initiatives* - It should be emphasized that many roadway improvements that benefit freight travel are included in other highway-related categories. This category accommodates or facilitates the specific needs of freight movement within the region. Roadway improvements in this category address special truck operating characteristics beyond the requirements of automobile use. Potential rail network improvements address freight train characteristics beyond the requirements of passenger rail service where shared use tracks are involved. Other improvements enable the increased movement of goods within and between transportation modes. Other improvements to benefit freight movement, while important, are not considered regionally significant and are not explicitly cited below. Some of these types of improvements include freight route signs, improved truck turning radii, and freight route mapping.

Isolated Safety & Environmental Improvements - Enhancing safety is an element of all improvement categories. This category encompasses improvements which target specific safety deficiencies. Any improvements which promote public safety and the general welfare, such as wetlands restoration and ground water clean-up, are included in this category. These improvements do not result in significant alterations in the transportation network, although some minor changes and operating efficiencies may result. Some of these activities include: installation of warning lights and signs, elimination of hazardous conditions, grooving, grading and superelevation, street light improvements, installation of median barriers, curbing, guide rail improvements, public transit signal system improvements, curve improvements, sight distance improvements, rumble strip installation, creation of wetlands, noise barriers and walls, monitoring and regulatory facilities.

Network Reconstruction & Maintenance -This category consists of improvements which maintain the existing transportation

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#### FINANCIAL PLAN



SEPTA Railworks Reconstruction Project

network. These improvements do not substantially alter the network characteristics (e.g., providing additional highway travel lanes). However, improved operating characteristics may result in increased operating efficiency. Capacity of facilities is not significantly increased by these improvements. Operating assistance to public transit providers is also included in this category. Some of these activities include: highway resurfacing, highway restoration/ rehabilitation, bridge rehabilitation/ replacement, drainage and culvert work, fleet conversion, public transit maintenance facilities, public transit track and overhead wire improvements, project related wetland replacement, public transit substation improvements, public transit operating facilities, public transit operating assistance, public transit infrastructure improvements, monitoring and regulatory facilities and elderly and handicapped facilities and equipment.

Passenger Intermodal Facilities - This category type entails improvements that promote intermodal travel (i.e., joint highway and public transit trips). Intermodal improvements afford enhanced opportunities for people to satisfactorily complete trips which combine travel modes. This may result in the reduction of single occupant auto travel demand. Some of these activities include: park and •
ride lots, transit station access, bus shelters and transportation centers.

#### Public Transit & Ridesharing

Improvements - Improvements in this category provide additional transit and/or shared-ride facility capacity. Transit improvements in this category are perceptible to riders and, therefore, may spur increased transit usage. Changes in travel patterns may be evidenced in the elimination or shortening of single occupant auto trips. Some of these activities include: high occupancy vehicle lanes, shuttle services, dial-a-ride services, car and vanpool services and facilities, exclusive transit way improvements, automatic ticket dispensers, new transit stations, transit station expansion, transit vehicle improvements, new and reactivated transit services, transit passenger communications and paratransit service improvements.

#### Roadway Improvements - This

improvement type results in a substantial increase in the capacity of a roadway to convey vehicular traffic. Improvements are large in scope (i.e., greater than one mile of new controlled access facility) and cost and require significant construction. These improvements include major widening, major relocation, major traffic circle improvements/eliminations, major intersection improvements, new roadway, new interchanges, major ramp improvements and grade separation.

*Traffic Operational Improvements* - This category includes improvements which result in minor modifications of the existing road network. The improvements are designed to derive the maximum

operating capacity from existing highway facilities. Improvements may range from minor construction projects to those which incorporate state-of-the-art technologies. Traffic flow improvements are restricted to spot locations or along minor stretches of corridors. In general, these projects do not exceed the equivalent of one mile of new controlled access facility.

Among the activities included are: directional signs, minor intersection improvements, signal progression/ coordination, minor realignment, minor reconstruction, channelization, traffic circulation improvements, increase of turning radii, motorist information systems, jughandles, ramp metering, incident management, intelligent vehicle highway systems, minor widening, minor ramp improvements, bus turnout bays, intersection turn lanes, minor traffic circle improvements/eliminations, improved traffic control devices and signal installation and modernization.

Transportation Enhancements/Amenities -Improvements which enhance the environs of the transportation network are grouped in this category. These improvements afford desirable products such as recreation facilities and visual enhancements and mitigate non-desired side-effects of transportation systems such as noise pollution. All bicycle and pedestrian facilities are also included in this category. Enhancements and other amenities do not necessarily have demonstrable impacts on traffic flow or transit operations. However, these improvements sensitize people to environmental and societal concerns and possess a kinetic value for encouraging

desirable travel patterns. Some of these activities include: rest areas, landscaping, pedestrian bridges and walkways, bicycle paths, visitor and rest centers, cultural and sightseeing transit services, acquisition of scenic easements and scenic or historic sites, scenic or historic highway programs, historic preservation, preservation of abandoned railway corridors, control and removal of outdoor advertising, archaeological planning and research and mitigation of water pollution due to highway run-off.

Travel Demand Management -Improvements in this category serve to better coordinate the demand for transportation with the availability of transportation facilities (giving preference to the accommodation of travel demand through public transportation and shared ride mechanisms). These types of improvements are intended to provide more efficient use of transportation systems and decreased congestion through alterations in the demand for various facilities without altering the facilities themselves. Some of these activities include: transportation management associations, special service districts, congestion pricing programs, public/private partnerships and entrepreneurial ventures.

DVRPC has estimated the cost of the nonaviation related facilities and services recommended in *Moving People and Goods* to be approximately \$21.0 billion. The draft *Year 2020 Regional Airport System Plan* includes an additional \$0.7 billion in aviation system needs of which slightly less than \$0.6 billion occurs at Philadelphia International Airport. The estimated cost for the recommended plan does not include routine maintenance or operating expenses (beyond that covered by federal operating subsidies for the transit system). These cost categories are extremely difficult to project over the time horizon of the plan, and, in fact have proved quite difficult to assess for even the current period.

Transit operating expenses, as reported in the financial statements of each of the operators, include all costs associated with providing the service and maintaining the system, including all labor, materials, utility costs, rents, and outside contracts. These expenses must be covered by farebox revenue, property leases, advertising revenue, and other income. What can not be met by these revenue sources must be covered by public subsidies, either local, state or federal. Seeking these subsidies focuses public attention on the transit operator.

Contrary to general public opinion, transit operating expenses, when adjusted for inflation, have been relatively constant. According to data taken from operating statements over the past 10 years, NJ TRANSIT's operating expenses have increased at an average adjusted rate of 1.1 percent per year systemwide, PATCO's at 0.7 percent, and SEPTA's has actually been declining at about 0.4 percent per year. Past trends, however, have limited utility in predicting future conditions. There are innumerable considerations which affect these trends including: labor contracts, regulatory requirements, operating characteristics, etc.

Highway operating expenses are covered by numerous parties and are only partially reported in governmental documents. The state DOTs and toll authorities annually report their expenses, though these expenses are generally not assignable to specific metropolitan regions nor are they necessarily limited to only the surface transportation operations of the agency.

In addition to these parties, the more than 360 local and county governments of the region expend in total a larger sum than the states on operating and maintaining the highway system. Their budgets and annual reports may or may not identify capital expenditures for their highways and roads, but seldom is there a separate accounting for the operating expenses related to their highway system. These costs include: street cleaning, snow plowing, grass cutting, street lighting, sign and signal maintenance, patching and resurfacing, traffic management and enforcement including traffic courts, etc. These expenses are usually covered by property, sales and other general taxes, representing a public subsidy of the highway system. Because of the large number of public bodies involved and the unrelated nature of the taxes, little attention is focused on this subsidy.

## Adequacy of Traditional Sources

DVRPC has estimated that roughly \$21 billion is anticipated to be available for transportation improvements for the region from traditional sources between 1996 and 2020. This estimate assumes periodic reauthorization of the federal surface transportation act at levels commensurate with those in the ISTEA of 1991, when adjusted for inflation. To maintain the current level of funding into the future, the plan makes the further assumption that there will be the necessary increases in the factors that support these funding programs (taxes, fees, general fund revenues, etc.). It further assumes that the state and local agencies providing matching funds for these federal programs will continue to meet those obligations. It also assumes that current levels of state funding for non-federal projects will be maintained.

Traditional sources will be able to cover the full cost of the needs identified in Moving People and Goods. Thus we can say that the plan is constrained to reasonably anticipated financial resources. However, the point needs to be emphasized here that the plan does not identify let alone provide for all of the region's needed improvements. As an illustration of this point, the financial constraint does not take into consideration the potential costs of projects which may evolve from the recommended studies list. The reader is referred to Postscript section of this document for further discussion in this regard.

Is this the direction that the Delaware Valley should take? *Moving People and Goods* recommends consideration of each of the alternative funding mechanisms identified above to find an equitable means to generate sufficient revenue to address the identified shortfall.

## Estimate of Costs for Projects in the Year 2020 Plan by Category (\$ millions)

Plan Category	Grouped Project Cost*	Individual Project Cost*	TOTAL Cost*
Freight Movement Initiatives	\$61.2	\$129.5	\$190.7
Isolated Safety and Environmental Improvements	\$562.4	\$149.5	\$711.9
Network Reconstruction and Maintenance	\$7,665.8	\$1,280.2	\$8,946.0
Passenger Intermodal Facilities	\$47.4	\$217.2	\$264.6
Public Transit and Ridesharing	\$1,992.1	\$3,703.7	\$5,695.8
Roadway Improvements	\$300.3	\$2,377.1	\$2,677.4
Traffic Operational Improvements	\$1,464.1	\$599.6	\$2,063.7
Transportation Enhancements/Amenities	\$147.2	\$0.0	\$147.2
Travel Demand Management	\$332.7	\$0.0	\$332.7
TOTAL	\$12,573.2	\$8,456.8	\$21,030.0

\* Individual Project Costs reflect assumed costs to complete plan projects (found on pp. 83-85). They also include assumed costs for the examples of potential systemwide improvements found in Appendix B. The Grouped Project Costs were obtained as extrapolations of the costs of other types of projects (work typical of projects found in the DVRPC TIP).

\*\* Please note: plan costs do <u>not</u> reflect the region's total transportation needs during the period of the plan. A variety of factors, including rising construction costs, the refinement of project scopes and the eventual construction of projects associated with major studies in the plan, will significantly add to these costs.

#### Assumed Traditional Sources Available Per Year By Program (Millions)

Transit		Highway	
Section 3A	\$99.33	Interstate Maintenance	\$34.50
Section 3B	\$29.00	Bridge	\$70.50
Section 3C	\$14.50	NHS & Interstate	\$122.33
Section 9	\$93.83	STP	\$73.67
Section 16(B)2	\$3.17	CMAQ	\$46.50
Section 18	\$0.33		
FTA Subtotal	\$240.16	FHWA Subtotal	\$347.50
State Transit	\$146.67	State Highway	\$58.34
Local Transit	\$18.33	Toll/Private	\$44.33
Non-FTA Subtotal	\$165.00	Non-FHWA Subtotal	\$102.67
Transit Total	\$405.16	Highway Total	\$450.17
TOTAL ANNUAL			\$855.33
GRAND TOTAL			\$21,030.00

## IX CONFORMITY WITH AIR QUALITY GOALS

#### BACKGROUND

Moving People and Goods was prepared with federal requirements for air quality goals in mind. Conformity is required by the Clean Air Act Amendments of 1990 and is intended to assure that transportation investment is consistent with air quality objectives as stated in the state implementation plans of Pennsylvania and New Jersey. These state plans identify emission reduction targets for highway sources as well as other mobile sources (such as aviation), point sources (such as factories) and area sources (such as lawn mowers).

This section describes the process used for the demonstration of the conformity of *Moving People and Goods*. Four aspects of the analysis are discussed: **projects tested** in the regional emissions analysis, **vehicle characteristics** to determine emissions rates, **future travel data** used to characterize highway use and **resulting emission levels** cited to determine conformity.

Mobile source pollutants addressed include volatile organic compounds (VOCs) and oxides of nitrogen (NO<sub>x</sub>), which produce ground level ozone, as well as carbon monoxide (CO). Consistent with the conformity rule, the analysis years for *Moving People and Goods* for ozone precursors (VOCs and NO<sub>x</sub>) and carbon monoxide (CO) are: 1990 (to establish a baseline), 1996 (as the first major

milestone year and the only one for which VOC emissions budgets have been established), 2005 (because it is the year by which the region must attain the ozone standard), 2015 (because it is ten years beyond the attainment year) and 2020 (because it is the horizon year of the 2020 Plan). Ozone precursors are estimated for July of each year and CO for January. The baseline (i.e., no-build) and action (i.e., build) networks are different for each of the future analysis years. The following table indicates the kinds of projects and activities which are considered in each future year and scenario.

## **PROJECTS TESTED**

According to the final conformity rule, the emissions analysis must model all regionally significant projects which are not exempt. Non-exempt highway and transit projects are those on facilities which serve regional needs and are included in the regional model, including at a minimum all principal arterials and fixed guideway transit facilities. Categories of exempt projects include: projects to enhance safety or esthetics, maintain mass transit, continue current levels of ridesharing, or build bicycle and pedestrian facilities. In Moving People and Goods, all projects are either considered exempt or regionally significant under the above definition. Regionally significant projects have been further categorized as either "baseline" or "action" depending on their projected completion. Any project which was found in the first three years of the previous conforming TIP (FY 1995) was considered part of the baseline scenario. All other projects from the TIP and all projects found only in *Moving People and Goods* are included in the action scenario.

The projects in both the baseline and action scenarios are separated into three

groups according to the date they are scheduled for completion:

- before November 15, 1996;
- before November 15, 2005; or
- before November 15, 2015.

Projects that are presumed completed prior

Year	Baseline scenario	Action scenario
1990 (Base Year)	All in-place regionally significant highway and transit facilities, services and activities in 1990	
1996 ( <u>Milestone</u> Year)	<ul> <li>All current additional in-place regionally significant highway and transit facilities, services and activities +</li> <li>All on-going TDM and TSM activities including the Employer Trip Reduction Program +</li> <li>Projects which are (1) under construction, (2) ROW is being acquired, or (3) have completed the NEPA process, and which will be open by 1996 +</li> <li>Projects which were in the first three years of the FY 1995 TIP, and which will be open</li> </ul>	<ul> <li>●+ ❷+</li> <li>Other regionally significant projects, including any TCMs, in the Plan open by 1996 +</li> <li>Non-federal regionally significant projects open by 1996</li> </ul>
2005 (Attainment Year)	0+0+         O         Additional projects from the last two categories of 0 above which will be open after 1996 and by 2005	<ul> <li>0+2+3+0+</li> <li>Other regionally significant projects as in ⊗ above open after 1996 and by 2005</li> </ul>
2015 (Interim Year)	<ul> <li>0+0+0+</li> <li>6 Additional projects from the last two categories of 0 above which will be open after 2005 and by 2015</li> </ul>	<ul> <li><b>0</b> + <b>2</b> + <b>3</b> + <b>0</b> + <b>5</b> + <b>3</b> + <b>3</b> + <b>3</b></li> <li><b>7</b> Other regionally significant projects as in <i>⊗</i> above open after 2005 and by 2015</li> </ul>
2020 (Horizon Year)	<ul> <li><b>0</b> + <b>2</b> + <b>3</b> + <b>6</b> +</li> <li><b>S</b> Additional projects from the last two categories of <i>2</i> above which will be open after 2015 and by 2020</li> </ul>	<ul> <li>①+❷+❸+④+ ①+ ⑤+ ⑦+ ③+</li> <li>Other regionally significant projects as in ⊗ above open after 2015 and by 2020</li> </ul>

## Projects and activities included in the regional emissions analysis

to one of the above completion dates *do not* become part of the baseline alternative for later years. For simplicity, it is assumed that all projects in *Moving People and Goods* will be completed by 2015. Therefore the 2020 project set is identical to the 2015 set.

Finally, projects must be analyzed either within the regional travel demand model or through some *off-model* technique, such as the CMAQ project evaluation procedures developed by COMSIS Corporation for Pennsylvania. This distinction is made to appropriately treat the effects of implementing projects which can not be effectively addressed within the travel demand model's capabilities.

#### VEHICLE CHARACTERISTICS

EPA requires the use of the MOBILE computer model to calculate composite emission rates which reflect the types of vehicles in use in the Delaware Valley region. Inputs into the MOBILE5a model, the latest version, specify the applicable inspection and maintenance programs, the available fuels, and the composition of the fleet of vehicles using area roads. These settings for the TIP and plan conformity demonstrations-

 have been agreed to by DVRPC, state transportation and air agencies, FHWA, FTA and EPA;



NJT Princeton Junction Station

- use the same set of ambient temperatures used to establish state emission budgets;
- may differ in other respects from settings used to establish state emission budgets;
- use default vehicle operating characteristics (percent cold start trips, for example), and
- use vehicle-miles of travel by vehicle type as developed by DVRPC.

A table in an appendix to the conformity report indicates the inputs for the base year 1990, milestone year 1996 and attainment year 2005. Settings for 2015 and 2020 will be the same as 2005 except for the calendar year.

### **FUTURE TRAVEL DATA**

Travel data is generated by the DVRPC regional travel demand model. Simulations are performed for each analysis year, for both the baseline and action scenarios. No changes to transit operating policies are assumed over the life of the plan and fares are anticipated to remain constant in comparison to the costs of driving.

Making use of the information from the travel simulation model in the conformity analysis requires subsequent manipulation of the output travel data. The simulation provides traffic volumes and vehicle-miles of travel (VMT) for each segment of road considered in the model. VMT on each link is divided into 24 one-hour periods based upon fractions developed by DVRPC. Roadway speeds are estimated through the use of curves relating anticipated traffic volume to roadway capacity. Additional vehicle travel on non-network (local) roads is included and is distributed to subareas in proportion to the amounts of arterial and local network travel experienced.

#### **RESULTING EMISSION LEVELS**

Consistent with the requirements for nonattainment areas in the transitional period of federal guidelines, the Delaware Valley Regional Planning Commission is responsible for determining that *Moving People and Goods* conforms to the state implementation plans of Pennsylvania and New Jersey. Specifically, the conformity determination must-

- be based on the latest planning assumptions;
- employ the latest emissions estimation model available (MOBILE5a);
- include applicable consultation procedures consistent with those described in the final rule and applicable SIP revisions;
- analyze a plan which does not interfere with the timely implementation of any transportation control measure (TCM); and
- assume that TCMs in the state implementation plans will be successfully implemented.

In addition, the regional emissions analysis meets all tests in the final rule, including the following:

		Person	Transit	Auto Driver	Vehicle	Vehicle Miles of	Avg Speed
Simula	tion Scenario	Trips	Trips	Trips	Trips	Travel	(mph)
1990	Base	16,446	859	10,971	14,052	99,008	26.2
1996	Baseline	17,342	851	11,586	14,906	106,263	26.4
1996	Action	17,342	851	11,586	14,906	106,263	26.4
2005	Baseline	18,448	843	12,362	16,006	118,067	26.2
2005	Action	18,448	847	12,539	16,003	117,811	26.3
2015	Baseline	19,610	842	13,167	17,084	127,950	25.8
2015	Action	19,610	872	13,149	17,065	127,293	26.1
2020	Baseline	20,085	835	13,504	17,539	131,914	25.6
2020	Action	20,085	876	13,479	17,513	131,304	25.9

Selected Statistics from Regional Travel Simulations (thousands)

- VOC, NO<sub>x</sub> and CO emissions for the action scenario in each of the analysis years are less than the emissions in the base year (1990);
- VOC, NO<sub>x</sub> and CO emissions for the action scenario in each of the analysis years are less than the baseline emissions in the same analysis year; and
- VOC emissions for the action scenario are less than the budgets for VOCs established by the states for 1996.

The following tables show the emissions of VOCs,  $NO_x$  and CO for the base year and the analysis years. Each entry consists of the output of the simulation from which is subtracted emissions reductions from off-

model calculations. Also subtracted, in the case of the action scenarios, are reductions from adopted employer trip reduction programs and other transportation control measures in the amounts claimed for them in the state implementation plans. The CO results are for CO nonattainment areas only-Philadelphia and Camden counties. The projects recommended in Moving People and Goods result in very little overall effect on emissions of highway vehicles in the region. However, to the extent that the projects do affect emissions, they represent a balance between improved transportation infrastructure and improved air quality.  $\square$ 

Simulation S	Scenario	PA	NJ	Region
1990	Base	181,890	86,410	268,300
1996	Budget	99,673	47,273	146,946
1996	Baseline	90,582	47,264	137,846
1996	Action	90,439	47,274	137,713
2005	Baseline	52,693	28,017	80,710
2005	Action	52,088	27,905	79,993
2015	Baseline	51,921	27,410	79,331
2015	Action	50,898	27,167	78,065
2020	Baseline	53,021	28,144	81,165
2020	Action	52,165	28,058	80,223

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## Emissions of Volatile Organic Compounds (Kg/July day)

## Emissions of Oxides of Nitrogen (Kg/July day)

Simulation	Scenario	РА	NJ	Region
1990	Base	156,523	89,630	246,153
1996	Baseline	121,506	72,834	194,340
1996	Action	121,189	72,870	194,059
2005	Baseline	98,965	55,978	154,943
2005	Action	98,659	56,045	154,704
2015	Baseline	103,246	57,451	160,697
2015	Action	102,805	57,318	160,123
2020	Baseline	105,777	58,948	164,725
2020	Action	105,647	59,037	164,684

## Emissions of Carbon Monoxide (Kg/January day)

Simulation	Scenario	Philadelphia	a Camden	Total
1990	Base	324,194	228,311	552,505
1996	Baseline	244,367	134,013	378,380
1996	Action	244,192	134,130	378,322
2005	Baseline	184,811	96,818	281,629
2005	Action	184,117	96,424	280,541
2015	Baseline	174,477	102,263	276,740
2015	Action	172,597	101,097	273,694
2020	Baseline	176,382	106,234	282,616
2020	Action	174,813	105,035	279,848
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#### POSTSCRIPT

#### USES OF THE PLAN

The plan's primary use is in providing a foundation and context for state and local governments, authorities, and others in the Delaware Valley to conduct long range planning. Many actors in the region make decisions that impact transportation. The plan considers all future travel and transport needs at the metropolitan level and then combines and condenses infrastructure and programmatic improvements into what may be regarded as the region's key transportation reference document.

Incorporation of the plan's goals and recommendations into other plans and capital programs provides an opportunity for reinforcement and support of the plan. Both New Jersey and Pennsylvania are in the process of developing statewide transportation plans, which are also guided by ISTEA. Other transportation plans also exist – ports, airports, public transit, and the private sector — which can advance the objectives of the plan. All of the counties in the DVRPC region have prepared or are currently preparing updates of their master plans. Perhaps of greater importance, the region's municipalities follow comprehensive plans in reaching many land use and transportation decisions.

*Guiding Regional Growth* has defined a hierarchy of land use categories and centers for the region with objectives for managing future growth. One method to

help influence those development objectives is to use infrastructure investments, particularly transportation improvements, as a tool to help foster, support, or even limit future growth. By first identifying a preferred land use pattern, then targeting transportation improvements, DVRPC can begin to better influence future growth patterns. Different types of transportation improvements will be applied in the different land use categories of the land use plan. The specific project recommendations of Moving People and Goods are reviewed against the land use map and the Transportation Improvement Matrix (see p. 58) to assure planning consistency and help to facilitate implementation of the land use goals.

One other vital use of the plan is as a guiding force in revising the regional Transportation Improvement Program (TIP). The TIP — the region's shortrange transportation improvement programming document, updated annually — contains projects that are slated to receive federal and other funds for engineering, right-of-way acquisition and construction or analogous activities. It is critical that each TIP be developed to carry out the region's long range plan.

The plan also provides the region with the ability to evaluate the progress of transportation initiatives. Plan evaluation should include examinations of the region's adherence to policies, advancement of projects and programs, and completion of technical studies. Recognizing these important roles, the plan does possess the qualities of interactiveness and flexibility. Since the development character of the region is constantly changing, the use of the transportation network will be changing as well. As a result, it is intended that the plan will be revisited on a regular basis to reevaluate its appropriateness.

#### ALTERATIONS TO THE PLAN

During the life of the plan, it is anticipated that implementing agencies will occasionally need to make changes to the plan. Federal regulations which implement provisions of ISTEA concerning the amendment and otherwise modification of TIPs do not set forth similar requirements for the modification of regional transportation plans.

Plans in air quality non-attainment areas, such as DIRECTION 2020, are required to be updated every three years to "confirm its validity and its consistency with current and forecasted transportation and land use conditions and trends and to extend the forecast period"<sup>1</sup>. Additionally, all projects in a metropolitan area's TIP must be consistent with the transportation plan. Consequently, amendments and modifications of the DVRPC TIP which are inconsistent with DIRECTION 2020 must be reconciled through alteration of the TIP, the plan or both. Where plans have been revised in such a way as to

<sup>1</sup>Title 23 CFR §450.322 (a)

affect their determination of conformity with air quality guidelines, the MPO, FHWA and FTA are required to make new conformity determinations. Lastly, the regulations prescribe a minimum of one public review and comment meeting per year to review the planning assumptions and plan development process used to prepare the transportation plan.

Without clear federal guidance regarding the need for amendments or other alterations of metropolitan transportation plans, these requirements have been left to individual MPOs to develop. In the case of the DIRECTION 2020 initiative, three documents are subject to such considerations. These are Guiding Regional Growth, Moving People and Goods and The Policy Agenda. The nature of particular alterations will dictate the documents to be affected. The following guidelines for the DIRECTION 2020 initiative are intended to provide a uniform approach for the treatment of alterations to the plan consistent with federal requirements and the methodology employed for the DVRPC TIP:

<u>Triennial Update:</u> The plan is scheduled to be updated every three years to reflect alterations to transportation facilities, operating conditions, demographic characteristics, planning objectives and other relevant factors. The horizon of the plan may be extended by an update. However, it is also prudent that the entire planning effort should be undertaken regularly to reflect more fundamental changes to planning assumptions and methodologies. The creation of a new plan is therefore envisioned to coincide with the availability of new census transportation planning data for the region. The MPO Public Involvement Process must be applied to any triennial update.

<u>Plan Amendments</u>: A plan amendment is the addition or deletion of any major project, goal, policy or program. Major projects consist of regionally significant projects that are not identified as Systemwide Improvements. They are explicitly mentioned in the body of the *Moving People and Goods* document (i.e., excluding projects only mentioned in the Appendices).

If the amendment adds or deletes a project that contributes to or reduces transportation related pollutants, a new conformity determination is required by the MPO, FHWA and FTA. DVRPC refers to this type of action as a Major Amendment. Otherwise, no new conformity determination is required (Minor Amendment). DVRPC staff will determine whether a project is exempt from the conformity requirements. If it is not exempt, the air quality impacts will be calculated using the regional conformity model. Staff will consult with the appropriate agencies, as necessary, in making this determination.

The MPO Public Involvement Process must be applied to any plan amendment, unless the amendment includes only minor projects that may be grouped by function, area, or plan category as permitted by the CAAA and ISTEA. <u>Plan Modifications</u>: Since other changes may need to occur within the plan that do not materially affect its major recommendations, an additional mechanism to affect these changes is provided. These types of changes are referred to as "Plan Modifications".

Modifications may include informational changes to narratives within the bodies of the documents. They also may reflect the addition or deletion of actions from *The Policy Agenda* and recommended studies from all documents.

Regarding transportation facilities, movement of major projects between short term and long term planning periods is considered a plan modification. Also, alterations to the sample list of regionally significant projects furnished as an appendix to *Moving People and Goods* are also considered plan modifications.

DVRPC brings the first two categories of changes to these three DIRECTION 2020 elements before the Board for action. They will be presented as "Triennial Updates" or "Plan Amendments". Once approved, plan amendments can then be reflected in either subsequent reprinting of the plan or supplemental documentation as needed.

Because plan modifications are strictly informational in nature, they are conducted at the staff level. Plan modifications are then incorporated in the next triennial update or reprinting of the plan. If reprintings of the final plan are made, they must be referenced by date.

## 2020 AND BEYOND — THE PATH AHEAD

Through the development of DIRECTION 2020, DVRPC has intended to establish a unified vision, subject to refinement, which deals with regional land use and transportation issues including traffic congestion, air quality, mobility and freight movement. The focus of the DIRECTION 2020 transportation plan, Moving People and Goods, is a series of multi-modal transportation corridors and centers which form the spokes and hubs of the metropolitan transportation network. The principal objective of this approach is to improve travel conditions within these centers and corridors in a coordinated fashion using appropriate forms of transportation. In this way, the region can solve transportation problems more cost effectively and the vitality of the communities using these facilities and services would be supported. The next step is to introduce this vision into the course of future planning work of all levels of government and other transportation stakeholders. The groups, in turn, will embrace some aspects of the plan and seek to modify others, ultimately leading toward a nexus of visions over time.

#### The Vision Becomes Clearer

What will the region look like in the year 2020? By laying out a series of goals that are both harmonious and achievable, we are able to get a better understanding of the region we hope to obtain. The plan points toward a singular vision of improved regional travel some of the

elements of which are described below:

The Delaware Valley is an exciting place to be in the year 2020. The engine of continued economic growth runs relatively unimpeded by former inadequacies in the transportation network. Infill development and redevelopment take place at an unprecedented rate while the business of farming continues largely uninterrupted. The region offers an unparalleled variety of appealing residential settings as older neighborhoods become infused with new life. Newer subdivisions, once islands in a sea of inaccessible development, coalesce into logical communities around strategically developed, pedestrian oriented centers. These centers offer various degrees of employment opportunities, commercial services, community use areas and access to public transportation. Strategically developed bicycle trails and walkways connect neighborhoods and community centers while a regional network of bicycle routes, lanes and paths provide for longer distance travel between major destinations.

Delaware Valley governments, partnering with other levels of government and the private sector, have committed to fully fund needed transportation improvements through a variety of means. The infusion of new funding for maintenance, bridge, and safety programs resulted in major initiatives to improve travel conditions. Construction crews seem to be constantly at work throughout the region not just repairing but improving pavements, bridges, drainage and other features. Local governments continue to be proactively involved the planning of improvements in each center and corridor and provide a groundswell of support for projects to move forward. Major studies identified in *Moving People and Goods* were undertaken shortly after its adoption and led to new initiatives which greatly improved the efficiency of the previous transportation system.

Regional Rail lines have been grade separated and otherwise improved to offer fast service into Center City from outlying areas during peak travel periods. Rail service improvements have been undertaken to provide the system with higher effective speeds than can be found on parallel highway routes. In fact, drivers—using intelligent vehicle systems in their cars to find the fastest way to Center City—are more often than not directed to the Regional Rail lines. A number of the shorter lines with limited parking have been integrated into the light rail network and offer more frequent service with some express runs. On the remaining lines, station consolidation programs in Pennsylvania coupled with improved rail signal systems, improved highway access, an aggressive feeder bus program and a parking lot expansion program led to much higher patronage. Several of these lines now extend beyond the Delaware Valley to provide connections with other major urban areas. This includes NJ TRANSIT's Atlantic City rail service which was integrated into the system.

In addition, weary drivers no longer fight congestion on major roads connecting suburban areas. Rather, buses together with carpools and a colorful variety of employer-based van services speed many of these people down high occupancy vehicle lanes past congested locations. Toll booth traffic jams are only a distant memory since standardized electronic toll collection was implemented throughout the region during the late 1990s. Drivers of newer vehicles are warned to avoid congested areas through communication with traffic control centers in Pennsylvania and New Jersey. Less detailed advisory information is provided to drivers of older vehicles via changeable message signs at strategic locations and updated radio messages. Special instructions for tourists about roadside features and specific destinations have been integrated with other standard highway signs and also make use of changeable message signs for special events. Comprehensive programs to deal with highway accidents and breakdowns were enacted by both states in cooperation with police departments, vehicle towing and repair services and other agencies. These programs provide regular surveillance, guick response and quick removal of disabled vehicles and other traffic impediments on an ongoing basis.

At the heart of it all remains Center City Philadelphia and the downtowns of Camden, Trenton and Chester. In the year 2020, NJ TRANSIT, PATCO and SEPTA services are fully integrated. NJ **TRANSIT and SEPTA buses travel in** coordinated fashion down the streets of Philadelphia and Trenton as traffic lights turn green in advance of their arrival by means of synchronized traffic signal systems. South Jersey commuters arriving on one of the three rail lines can freely transfer to Market-Frankford or Broad Street trains at any of the shared concourses and vice versa. The new Market West Station has touched off an upsurge in real estate activity in the burgeoning western half of Center City. The common fare mechanism recognized by all three transit agencies is already responsible for a large amount of transit activity throughout the day and is widely praised in the local tourism industry. The Center City/ Camden fare zone, discounted by the local business community, has also added to the demand for transit service on both sides of the river. Redevelopment efforts around the Camden PATCO stations are increasing in popularity as waterfront related developments and these projects expand toward each other.

The Port of Philadelphia and Camden is one of the most active in the nation thanks in large part to a regional commitment to unified planning, modernization, and customer satisfaction. Joint public-private planning and well defined roles for different portions of the port area yielded many timely improvements. Some of these efforts included: a uniform highway signing program for goods movement, the standardization of drayage costs between facilities, and access improvements - such as the improved Schuylkill River rail crossing near Grays Ferry Avenue. This in turn created an environment where resources were better managed, transfers became faster and technological improvements were readily implemented.

Other rail improvements had similar effects on freight movement in the region. The new intermodal yard at the former Mustin Field site increased South Philadelphia's capability to handle containers and trailers by truck and rail. Increased clearances over main rail lines south of the port area (required for the use of double height container cars) were strategic in increasing intermodal rail traffic between Philadelphia and points south. Similarly, increased clearances in the Art Museum tunnels enabled the abandonment of the aging elevated line west of 30th Street Station previously used to convey these double height cars.

The capstone of public sector involvement in freight planning was the reconstruction of I-95 in Pennsylvania, conducted entirely in concert with the goods movement community. The "new I-95" features many truck-friendly improvements such as weigh-in-motion stations, a truck rest area in South Philadelphia and redesigned interchanges.

With unparalleled efficiency and a vast array of freight related facilities, the region competes successfully to attract and retain customers for its freight services. The success of the region's exclusive *FastShip* service has become an international symbol of the dedication of the region to competitiveness in international goods movement. Every year, it seems, new records are set for speed, quantity, variety and dollar value of goods passing through the region. A great deal of this rise in traffic is due to the burgeoning domestic use of the port as the products of Pennsylvania, New Jersey and elsewhere come into the region for export.

#### **ANSWERING THE TOUGH QUESTIONS**

So long as facilities and services in the centers and corridors perform in satisfactory fashion, it is presumed that the transportation system is being adequately managed. However, it is well documented that there are many problem locations in the present system where congestion is routine, accidents frequently occur and/or various portions of the transportation system are inaccessible for certain populations. This document attempts to deal with identified problem locations and travel needs in an appropriate and coordinated fashion. It is based, however, on existing studies and plans. It takes for granted existing institutional arrangements and other fundamental features of the present system. In order to effectively deal with the dictates of anticipated land use patterns and the issues of congestion, air quality, safety, mobility and economic competitiveness at a regional level, the region must be prepared to properly identify and deal with basic policy questions.

DVRPC, as the accepted forum for the

planning of orderly growth in the region, is perhaps best suited to provide the forum for such discussions. Indeed, it was in recognizing this role that DVRPC developed *The Policy Agenda* for DIRECTION 2020 which established a series of policies to address various issues of transportation planning. In developing *Moving People and Goods*, key policies from the *Agenda* were combined with facility and program recommendations to begin deal with critical planning issues.

What are some of the fundamental issues that must be addressed and how does DIRECTION 2020 point toward rational solutions? Examples for the four transportation related issue areas follow.

## Traffic Congestion

To combat increasing automobile use, is increasing congestion sometimes a desired end to encourage people to take transit? If not, what would need to take place to have less crowded roads and more heavily utilized buses, trolleys and trains and are those steps desirable?

Highway congestion within the centers and corridors was always treated as an undesirable situation. The region, however, should not be responsible for congestion caused by large amounts of unplanned development in outlying areas.

Conventional transit services are not sufficiently extensive to accommodate the travel needs of most of the present highway users. Currently, public transit trips account for roughly five percent of all person trips in the region. Unless demographic trends and other conditions greatly change between 1990 and 2020, a sizeable number of transit improvements will be needed just to maintain this percentage. A growing percentage of the workforce lives and/or works in locations that are not adequately served by the current transit system during peak periods. At other times of day, travel patterns become considerably more varied and highway congestion normally abates. In some locations, midday congestion is also a problem as people travel from their worksite to restaurants, shops and other destinations. In both of these situations, public transit services have even more difficulty attracting riders away from highway travel. In areas that are currently well served by public transit, selectively expanding and improving transit services can lure additional drivers out of their autos.

The door-to-door convenience and readily available nature of automobile travel are aspects not found in traditional transit services. Employer-based carpool and subscription services operating during peak periods that employees can freely opt into or out of are needed throughout the region and have been established in numerous locations. Also, a guaranteed ride home program should be established for workers who can't conveniently make return trips using their shared ride service. In a similar fashion, midday congestion needs to be addressed through compact, mixeduse development forms, urban circulator routes and other means on a case by case basis.

Another means to reduce highway congestion is to avoid the need for persons to take trips, either during congested travel periods or at all. The widespread cooperation of area employers in allowing their employees to alter their work routines can greatly reduce morning and evening traffic tie-ups. Staggering working hours, for example, can help to spread out the demand for certain congested roads over the course of a business day. Allowing employees to work fewer, longer days means that fewer automobile trips have to be made at all. In some instances, working at least part of the time from home can have the same effect. Modern telecommunications technologies have opened up new possibilities for employees working at home to interact with their employers. Obviously, the extent to which each of these techniques can be used will depend on the needs of individual employers.

An additional factor that needs to be considered in addressing highway congestion is in overcoming the mindset that driving alone, when there are other options, has no detrimental effects. Economic incentive and disincentive programs have been proposed to encourage transit and other shared ride options over driving alone to counter this tendency. These strategies will have to be evaluated further in conjunction with public outreach efforts with the same objective.

Do we need to fully revitalize the older cities and towns to make the transportation system work? Is the trend toward greater suburbanization of the existing job base an inevitability? Probably not, since Philadelphia and Trenton and a variety of traditional city centers remain the hubs of a great deal of employment and commercial activity. However, their roles as such are declining and, with the opening of major new thoroughfares in the suburbs (such as I-476, NJ 55 and US 422), the pressure toward rapid suburbanization is sure to escalate.

If the older cities and boroughs continue to decline in population and employment, the implication is that the region's large investment in public transit will decline in usefulness for regional travel. The two are inextricably linked. The question then arises as to how responsible the region should be for the collective vitality of these communities. The region needs to band together around programs to foster employment opportunities and improve the quality of life in targeted areas of older cities and towns. The region also needs to act to preempt uncontrolled development of outlying areas. The older cities and towns, conversely, need mechanisms to act upon the concerns voiced by the rest of the region in response to these efforts. They need to target growth in support of regional transportation corridors and act as an intermediary in the face of local opposition. The means for building a consensus around these objectives and developing appropriate courses of action should be explored.

How can the negative transportation impacts of large developments be mitigated when land use control rests entirely with municipalities?

Where developers are free to choose between municipalities for locating major developments, it is in their own best interest to select the location that will require the fewest improvements-all other factors being equal. Municipalities competing for sources of revenue to keep their tax rates low, avoid driving large scale developments away by asking for sizeable improvements. The ultimate consequences of failing to properly address transportation needs is measured in deteriorated travel conditions for the highway user and/or the taxes needed for improvements that would otherwise not have to be made. To avoid this situation, which sets municipalities against each other, it seems reasonable that county-level approval of large-scale developments should be obtained. The responsibility would then fall to the counties to avoid confrontations with these municipalities while at the same time acting in the best interest of the larger community.

Since municipalities control land use decisions, devolution of some measure of the transportation planning process is also in order. Corridor based, multi-municipal planning of transportation improvements is a fundamental aspect of any strategy to address this concern. One of the objectives in establishing the corridors and study areas in *Moving People and Goods* was to define the areas of common interest and identify the municipalities for such discussions to take place. The fundamental work of DVRPC in overseeing the multi-municipal planning of corridor improvements will be in determining the regional implications of alternative strategies as they are considered. This is an ongoing process.

# Are there opportunities to leverage private support for transportation improvements?

A number of different types of private sector initiatives that may be used in the Delaware Valley have been identified in the Financial Plan chapter of this plan. However, the success of each strategy hinges on its acceptability. Businesses that are inherently affected by the transportation system (i.e., all businesses) must recognize their roles in investing in that system. This being the case, DVRPCthrough the Transportation Management Associations (TMAs)-needs to monitor the perceived transportation needs of the business community. In some instances, an educational outreach effort on the region's travel conditions and partnering being done in other communities may enroll private sector support. For the most part, however, entrepreneurial ventures and public-private partnerships will emerge from the concerns of the businesses which have identified transportation needs through close observation of local conditions.

#### Mobility

What forms of transit service do we need? What should be their roles? What issues impact their cost effectiveness? All modes have traditional markets in the region. The challenge seems to be in finding the most cost effective approach to integrating these elements into a unified system recognizing the strengths and weaknesses of each mode. This approach must recognize these traditional markets and minimize inconvenience to existing transit users.

The general configuration of the system with redundant bus, light rail, heavy rail and commuter rail lines operating on largely independent schedules must be reconfigured. Redundancies should not be allowed where adequate capacity is offered by a single mode. Means of fare payment and fare schedules need to be standardized across all modes. This may also lead to realignment of bus routes and alterations to schedules to avoid direct competition with rail services. All bus and light rail intermodal connections with heavy rail and commuter rail lines must have schedules with designated layovers at these locations to minimize the inconvenience from required transfers.

Buses, when compared with automobiles in the suburbs, tend to run with fewer passengers due to slower travel times, long headways and circuitous routing. Buses in the suburbs need direct, high speed paths between communities where they circulate. Strategies to improve bus travel speed include transitways/HOV lanes and signal preemption.

The reverse is often true for city buses where overloading of passengers during the peak periods can occur. The most

heavily travelled bus route in the SEPTA system is Route C which, for the most part, runs directly above the Broad Street Subway. At first blush, it may appear that the Broad Street Subway and Route C along Broad Street are redundant. Yet the subway and bus are both well patronized in part because each serves its own distinct market. Bus routes and schedules have remained relatively stable over time even in the face of curtailments. This being the case, SEPTA and city officials should closely scrutinize this system for various mechanisms to increase travel speeds and minimize lavover times. Traffic signal synchronization to favor transit needs to be pursued along major transit thoroughfares (e.g., Philadelphia's Transit First program).

The heavy rail lines are the backbone of the urban transit system. They provide the highest level of service in the most heavily travelled corridors radiating from Center City Philadelphia. As such, they should be well served by buses and light rail lines operating with timed transfers at intermodal locations. New opportunities for improved transfers with light rail lines will occur with the anticipated return of service on various routes in the city. Aside from the Burlington-Gloucester corridors, no similar opportunities exist to augment the existing PATCO service with other light or heavy rail lines.

Regional Rail lines typically have stations too close together and travel speeds too slow to operate effectively in their service areas. Together, they maintain service schedules more suited to an urban rail network while the differences in ridership levels by line and by time of day are dramatic. Fundamentally, Regional Rail lines that do not extend into the outlying suburbs (e.g., beyond I-476 to the west or I-276 to the north) should be examined for conversion to alternative service technologies such as those being considered for the R6 Norristown line and R8 Fox Chase line.

In some instances, Regional Rail lines parallel light rail lines between Center City and their outlying destinations. Various means to coordinate these services to serve the same ridership should be investigated. An example of such an approach might include reduced hours on the Regional Rail line with improved connections and the offer of improved off peak light rail service.

## Do we need to integrate transit services on both sides of the river?

The primary problem is the need for better integration of services in Center City where transit travel is the greatest. This means that SEPTA and PATCO need to seriously move toward a common fare collection system for their heavy rail lines.

NJ TRANSIT and AMTRAK already have a joint ticketing agreement for the Atlantic City rail service. This needs to be extended to all commuter rail service in the region. A common fare instrument for travel on NJ TRANSIT buses and SEPTA would also serve to increase transit ridership. How should we handle the needs of interregional passenger and freight travel (Northeast Corridor, South Jersey, Harrisburg and west)?

Private passenger and freight carriers make investment decisions that change with the dictates of their users. In the interest of accommodating the needs of interregional travel, DVRPC needs to monitor the perceived transportation needs of the passenger and freight transportation communities. Opportunities to improve interregional travel will emerge from the concerns of the businesses which have identified transportation needs through close observation of local conditions. TMA-like organizations are required to gather this input for these communities. DVRPC's Goods Movement Task Force effectively serves in this capacity for the freight community. Because of its singular role with intercity and commuter rail travel, additional efforts need to be made to integrate DVRPC planning efforts with those of Amtrak.

Can we restrict truck travel on our roads and/or ask the trucking industry to bear more of the costs of the road repairs they necessitate and remain an economically competitive region?

There is arguably a subsidy of truck travel in the region, beyond that of automobiles, through the maintenance of roads that are disproportionately damaged by truck travel. The region must remain wary, however, of additional taxes levied on trucks to recover these costs. Because truck travel is integral to the movement of goods in the region, a tax that impacts the trucking industry is tantamount to an additional tax on all goods produced in and/or destined for the region.

Rather, we must look more closely at how trucks are using the highway network and identify locations where high truck volumes have been harmful to facilities or to the surrounding community. Armed with this information, alternative means to limit truck travel or compensate for these conditions can then be explored. We must also look at the implications of changes to tolls for trucks on their use of the various toll facilities in the region. The goal of this exercise should be to maximize toll revenues from trucks while at the same time minimizing toll evasion. The former addresses the issue of compensation for truck damage to the toll facility. The latter addresses the issue of limiting truck damage to parallel facilities.

## Can the interregional shipping needs of a widely dispersed industrial base be met through our existing rail network?

The Delaware Valley region enjoys a high degree of connectivity with the rest of the continent by freight rail lines. The presence of the three Class I freight railroads in the port area of Philadelphia is a highly valuable asset in fostering interstate commerce in the region. It is in the region's collective interest to monitor the economic trends affecting those shippers who currently use the railroads. At the same time, new business—both inside and outside the region—should be pursued for all three railroads in a healthy, competitive environment. These activities must take precedence over any efforts to encourage local shippers to reevaluate their existing decisions on shipping modes.

#### Air Quality & Environmental Concerns

Should the region continue to explicitly consider the minimization of vehicle emissions as a criterion for determining which transportation projects are built?

Current federal regulations prescribe that, for regions that do not attain federal air quality standards, all existing and proposed transportation facilities must be analyzed in sufficient detail to permit conformity determinations to be made on their long range plans. The implication of this requirement is that the cumulative effect of individual projects in the plan upon regional air quality is significant and unchanging beyond the period of the plan. In the process of air quality modeling, vehicle characteristics and travel behavior are the predominant factors. On the other hand, expanded highway capacity over time can increase single occupant vehicle trips, and may have adverse impacts on long range travel behavior and air quality.

While most would agree that air pollution could be reduced, the need to model the effects of facility improvements can be both restrictive and misleading. For example, a highway capacity improvement in the latter years of the plan might exact more short term congestion relief than a variety of transit improvements. However, if the expanded facility becomes congested again beyond the life of the plan, the air quality benefits of the added capacity diminish.

Since it has been difficult, to date, to achieve significant pollution reduction through changes to facilities, perhaps these effects should no longer be part of the planning process. Plan conformity should instead be evaluated for the combined effects of technological improvements as well as regional and subregional programs intended to reduce highway related air pollution. The overall thrust of the plan to limit new highway capacity in outlying areas should be relied upon to reduce the amount of highway related sprawl development in these areas.

#### Funding

The cost of the transportation plan was limited to assumed available financial resources. If we build its projects and enact its programs will we solve all our transportation problems?

It is not reasonable to assume that the congestion, mobility, maintenance and other transportation problems we presently face will be solved using only existing financial resources. Plan projects and programs form a good foundation for any effort, however, by dealing largely with better management of the existing system.

The success or failure of the plan in tackling these problems will in large part be dependent on two additional factors: the implementation of the land use plan and securing of adequate supplies of funding for future work. The land use plan is integral to the long term relevance of various transportation improvements. Similarly, additional funding will become increasingly important to insuring their timely implementation.

The vision statement set forth earlier in this chapter included the implementation of a number of the plan's recommended studies. Although these studies are not well enough defined in the plan to determine projected costs, realistic assumptions about potential study recommendations yielded a total figure of \$9,432 million. This would add an additional 45% to the cost of the plan if none of the current projects are to be eliminated.

#### CONCLUSION — THE PATH WE TAKE

Moving People and Goods deals in broad fashion with fundamental questions about the region's transportation needs through the year 2020. It provides for important facility improvements as well as major programs and policies to both address specific deficiencies in the existing network and provide guidance regarding the critical issues facing the region. In the same way that more detailed study of proposed facilities will be required prior to their implementation, more deliberation with affected parties will be necessary to determine the precise policies to be employed in responding to these issues. DVRPC must continue in its role as regional planning forum to advance these

discussions among stakeholders; holding out the vision of a vastly improved future while educating them about the critical concerns of the present.

\* \* \*

This document began with an account of the torrential rains of July 14, 1994 that temporarily paralyzed travel in the region. Although the event was one beyond human control, it also serves as a powerful reminder, at a personal level, of the importance of transportation and mobility to our daily lives. Transportation systems and services get us to work, the doctor's office, the mall; carry everything we buy, everything we discard and so forth. The transportation plan contained in this document is an attempt to control what we can of our destiny and to meet the travel needs of the region's residents and businesses through the year 2020.  $\square$ 

## APPENDIX A

MAP 1: EXISTING HIGHWAY AND RAIL TRANSIT NETWORK MAP 2: REGIONAL ANALYSIS CORRIDORS MAP 3: MAJOR TRANSPORTATION INITIATIVES 1995–2005 MAP 4: MAJOR TRANSPORTATION INITIATIVES 2005–2020 MAP 5: MAJOR STUDY CORRIDORS AND AREAS











## APPENDIX **B**

Detailed Project Descriptions and Suggested Systemwide Improvements

New Corridor Facilities and Services Improved Corridor Facilities and Services Improved Transportation Connections Systemwide Improvements

## **APPENDIX B**

The following 69 projects are specific recommendations of the plan to improve regional travel conditions. Their individual air quality benefits, where appropriate, and implementation costs were taken into consideration in the analyses of the plan's recommendations.

# NEW CORRIDOR FACILITIES AND SERVICES

Between 1995 and 2005

New Jersey

1. Burlington-Gloucester Transit Lines

- Implement fixed guideway transit service between Center City and Mt. Holly as well as between Center City and Glassboro.

#### 2. NJ 92 (Hightstown Bypass)

-Construction of the Hightstown Bypass section of NJ 92 will provide a new highway that will extend from the vicinity of the NJ Turnpike and NJ 33, east of Hightstown, to the vicinity of US 130 and CR 571. NJ DOT had identified this improvement as a SOV Project.

Pennsylvania

3. Restore Regional Rail service to Newtown via preferred alignment.

4. PA 63 (Woodhaven Road Extension) — Construct a four lane expressway extending the existing Woodhaven Expressway to Philmont Avenue and replace Byberry Bridge. This project has been identified by PA DOT as a SOV Project.

5. Provide a new commuter aircraft runway (8-26) at Philadelphia International Airport to increase airport capacity and reduce delay in bad weather. Initial FAA grants were received in FY '94. Additional support will be needed for land acquisition and construction.

6. Facilitate R3 travel to and from the western portion of the {Painters Crossroads to Center City} corridor and points south and west by **restoring R3 rail service to Wawa** with a park and ride lot at US 1.

#### Between 2005 and 2020

**7. Realign US 202** from Montgomeryville to Doylestown Bypass as a four lane, divided highway.

# IMPROVED CORRIDOR FACILITIES AND SERVICES

Between 1995 and 2005

New Jersey

8. Creek Road (CR 636) — This

improvement calls for the reconstruction of the existing lanes from a pavement width of 20 feet to a width of 40 feet with two 8 foot shoulders, including reconstruction of five culverts and addition of auxiliary
lanes at intersections between CR 613 and Moorestown-Centerton Road.

## 9. CR 534 (Blackwood Clementon

**Road)** — Widen to 4 lanes and interconnect signals between NJ 42 and CR 673 (Laurel Road)

**10.** CR 555 (Main Lake Road) between US 40 (Harding Highway) and Wheat Road — Reconstruct and widen.

### 11. CR 571 (Princeton-Hightstown

**Road)** between Wallace-Cranbury Road and Clarksville Road — Widen to four lanes, add signals and install left turn lanes.

**12.** CR 689 (Berlin-Cross Keys Road) — Widen and install new traffic signals from NJ 47 to US 30 and construct Cross Keys Bypass.

**13.** Extend Deptford Center Road across NJ 55 and connect to Almonesson Road.

14. NJ 42 (North-South Freeway) — This facility will be widened to add a fourth lane in each direction. The widening will take place in the existing grass median, minimizing the need for right of way acquisition.

**15.** US 1, Brunswick Pike — Widening to six lanes from CR 533, Quaker Bridge Road to Alexander Road.

## Pennsylvania

**16.** Allendale Road — Widen to 48 Feet between Wills Blvd. and Crossfield Road, also install signal at Elliot.

17. Blair Mill Road — Blair Mill Road will be widened to two lanes in each direction between County Line Road and PA 63. Improvements to the intersections along Blair Mill Road are also included. This project will significantly increase the capacity of this facility and it has been identified by PA DOT as a SOV Project.

### **18.** Chestnut Street Transitway

Reconstruct the streetscape including the cartway, the sidewalks and sidewalk furniture.

**19.** County Line Road — Reconstruction and widening to four lanes from Buck Road to New Road in Upper Southampton Township, Bucks County.

**20.** Dresher Road — Widening to 48 Feet by adding a lane in each direction between Horsham Road (PA 463) and Welsh Road (PA 63).

21. Construct the I-95 Intermodal Mobility Project; include features to address port access issues as may be needed.

Also, restore lane balance on I-95 by adding one lane in each direction at the I-476 interchange (between mileposts 5.9 and 6.7). (integrate with I-95 Intermodal Project)

## 22. Market-Frankford Line Reconstruction/New Cars —

Frankford Elevated Reconstruction

*Program:* This project will reconstruct a 5.2 mile section of the elevated structure, including eleven stations. In addition to structural improvements, the tracks, signals, communication and power systems will be replaced.

#### Market-Frankford Infrastructure

*Improvements:* This project will provide for the rehabilitation or replacement of infrastructure and associated components of the subway-elevated line. A systems analysis will address all pertinent operational issues concerning the integration of the new Market-Frankford cars. System components include track improvements, signal system rehabilitation, maintenance facility renovation, and power system rehabilitation.

*Market-Frankford Car Acquisition:* This project will provide for the acquisition of up to 220 new subway-elevated cars. The new cars will enhance passenger safety, security, and comforts; meet Americans with Disabilities Act (ADA) requirements, and include self-diagnostic capabilities for key system components.

*Market Elevated Reconstruction:* This project will provide for the rehabilitation of deteriorated structural components on the Market Street Elevated portion of the Subway-Elevated line.

23. North Philadelphia Light Rail Transit System — Infrastructure Improvements — This project provides for improvements to light rail infrastructure related facilities, including storage and maintenance shop, power distribution system and substations, tracks, and loops along trolley Routes 15, 23, 56.

Light Rail Vehicle Purchase Program: Purchase of up to 70 new state-of-the-art light rail vehicles that will operate on Route 23, from Chestnut Hill to South Philadelphia; Route 15, from Port Richmond to West Philadelphia; and Route 56, from Northeast Philadelphia across North Philadelphia. These three lines carry approximately 50,000 average weekday riders.

24. PA 63 (Welsh Road) — This improvement will provide a significant increase in capacity by widening this road to a four lane facility from Tennis Avenue to Kimball Avenue in Montgomery County. The widening will require intersection improvements at various intersections along this corridor. PA DOT had designated this project as a SOV Project.

25. PA 291 (2nd Street/4th Street) — This project is set-up in two sections. Improvements to the section between Ridley Creek and Franklin Street include a relocation and five lane widening with a center turn lane. The section from Franklin Street to Trainer Borough will also be widened to five lanes with a center turn lane. Construction will take place in stages with the eastern segment to advance first. 26. I-95/PA 413 Interchange and PA 413 (New Rodgers Road) Widening — This regional highway improvement consists of two separate projects. The first project, an improved I-95/PA 413 interchange, will construct a southbound off ramp from I-95 to PA 413. The second project will widen PA 413 to four lanes between US 13 to north of Ford Road. PennDOT has identified these projects as SOV Projects. Both projects complement the proposed I-95/PA Turnpike Interchange improvement, which will widen I-95 from four to six lanes between the PA Turnpike and PA 413.

**27. PA 611 (Easton Road)** — Signal improvements and adding a lane between Blair Mill Road and Pennsylvania Turnpike.

**28.** Sumneytown Pike — Intersection improvements and adding a lane between South Broad Street and West Point Pike, also relocation of Allentown Road.

29. Swedesford Road — (see Project No. 31 below for narrative)

**30.** US 1 (Baltimore Pike) Improvements — The project improves traffic flow through minor widening, and the installation of median barriers, left turn lanes and jughandles. A small bridge maintenance project is also included.

31. Widen US 202 between the Delaware State Line and I-76 from four to six lanes.

Section 100 (Delaware State Line to West Chester): Four alternatives are under

review. One alternative would widen the 7.8 mile segment from four to six lanes. Other improvements under investigation include median improvements, intersection improvements, improved signal coordination and a grade separated intersection at Painters Crossroads (US 1/US 322). Improvements to this section of US 202 have been identified by PA DOT as a SOV Project.

Section 300 (US 30 to PA 252): The intent of this project is to increase the capacity of US 202 by widening an 8.9 mile section from four to six lanes.

Section 400 (PA 252 to I-76): This project will significantly increase the capacity of US 202 by widening a 2.6 mile section from four to six lanes. Construction will entail improvements to the I-76 interchange, namely adding a second lane to the ramp between northbound US 202 and eastbound I-76. Other interchange improvements will occur at US 422, Warner Road, and Swedesford Road (Project No. 29). The Warner Road and Old Eagle School Road bridges will be replaced and a new ramp will be constructed parallel to US 202 that will connect an extended Devon Park Drive and the US 422 interchange to eastbound I-76. PennDOT has identified this as a SOV Project.

Additionally, Section 500 (I-76 to Johnson Highway): Alternatives analysis is currently underway. Improvement alternatives include the reconstruction of Markley Street with minor widening, signal improvements and turn lanes.

#### APPENDIX B

**32.** US 202 (Dekalb Pike) between Johnson Hwy. and Montgomeryville — Widen to four lanes.

**33.** US 1/US 322 from US 202 to US 322 in Concord Twp — Widen to six lanes.

Also, US 322 (Conchester Road) — An environmental analysis and preliminary engineering study is investigating a number of improvement scenarios including increasing the capacity of this facility by widening from two to four lanes, a five lane highway (four travel lanes and a center turn lane), median barrier, jug handles at major intersections, and other intersection improvements. PA DOT has identified this improvement as a SOV Project.

### Between 2005 and 2020

New Jersey

34. CR 536 Spur (Williamstown-New Freedom Road) — Widen to four lanes from NJ 42 to CR 706 (Erial New Brooklyn Road), and add movements at the Atlantic City Expressway.

**35.** CR 706 (New Brooklyn-Blackwood Road) — Widen to four lanes from CR 536 Spur (Williamstown-New Freedom Road) to CR 689 (Berlin-Cross Keys Road).

**36.** Extend **Kuser Road** easterly to Robbinsville Road (CR 526).

**37.** NJ **70** (Marlton Pike) from east of Marlton to Medford — Widen from two lanes to four lanes.

**38.** US 130 (Bordentown-Burlington Road) — Widen between Wood Street and US 206 to six lanes, construct median barrier, jughandles, and widen major crossroad intersection approaches.

**39**. Widen US **322** (Swedesboro-Bridgeport Road) from US 130 to NJ Turnpike to four lanes throughout.

Pennsylvania

**40.** County Line Road from PA 309 to PA 611 — Widen to two lanes per direction with center turn lane.

**41. Germantown Pike** between PA 363 and North Wales Road — Widen to four lanes.

**42. Henderson Road** from South Gulph Road to US 202 — Widen to four lanes.

**43. PA 63 (Welsh Road)** from US 202 to North Wales Road — Widen to four lanes.

**44. PA 100 (Pottstown Pike)** from US 30 to PA 401 — Widen to three lanes per direction.

**45.** US **30** (Lincoln Highway) from US 202 to Whitford Road — Widen to two lanes per direction with center turn lane.

**46.** West Trenton Avenue between US 1 and the Delaware River — Widen from 2 to 4 lanes.

## IMPROVED TRANSPORTATION CONNECTIONS

### Between 1995 and 2005

New Jersey

47. Burlington City Transportation Center — Construct a transportation center with a park & ride lot and passenger amenities at Broad and High Streets in Burlington.

**48**. Develop the **Cherry Hill Mall Transportation Center** — requires an integrated development and transportation plan. Establish a new circulator bus route to the Cherry Hill rail station, provide additional support by installing passenger amenities at the center and increasing feeder bus service.

**49**. Northeast Corridor Line **Hamilton Transit Complex** — This NJ Transit project incorporates two facilities critical to the bus and rail operations of central New Jersey. The bus maintenance facility will provide maintenance and storage capabilities for 80 buses, and the rail station includes high level platforms, a pedestrian tunnel or bridge and parking for 1,700 vehicles.

**50**. Develop the **Moorestown Mall Transportation Center** — requires an integrated development and transportation plan. Increase feeder bus service to the center and provide additional passenger amenities.

## Pennsylvania

**51. Bensalem Transportation Center** — Provide 1,000 parking spaces at Woodhaven Road and the SEPTA R7 Cornwells Heights Station.

**52.** Chester Transportation Center — Rehabilitate the station serving the R2 Wilmington Regional Rail Line, install elevators, and reconstruct bus loop.

**53.** FastShip Terminal — construct a high technology terminal facility and related highway and rail access improvements intended to serve FastShip Atlantic port activities. This terminal is to be located on the site of the Philadelphia Naval Ship Yard (PNSY).

**54.** Frankford Terminal Improvements — Reconstruction of the existing center into a multi-modal transportation center. The proposed terminal consists of a main terminal building with an elevated track platform and a 1,000 car parking garage. Bus and trackless trolley activities will be divided among four basic areas within the center. The existing center serves 52,000 riders per average weekday and the improvements will create a more functional, yet user friendly, center that will improve service and provide easier and safer transfers among modes.

Also, eliminate on-street parking at Frankford Terminal to improve traffic flows through the area.

# **B-6**

55. I-95 (Delaware Expressway)

**Interchange** with Aramingo Avenue and Torresdale Avenue — Complete the interchange ramps providing local access between Aramingo and Torresdale Avenues and I-95.

### 56. I-95 (Delaware Expressway)

Interchange with PA Turnpike (I-276) — Construct a high-speed, full interchange between I-95 and the PA Turnpike. Widen the PA Turnpike between US 1 (Interchange 28) to US 13 (Interchange 29) from four to six lanes, and construct a second bridge over the Delaware River. Widen I-95 between the PA Turnpike Interchange and PA 413 (New Rodgers Road) from four to six lanes. Construct new toll facilities on the PA Turnpike. The project is being built in partnership with the PA Turnpike Commission who is contributing to its cost. This improvement has been identified by PA DOT as a SOV Project.

## 57. Construct a King of Prussia

**Transportation Center** at the malls with a distinct, climate controlled waiting area adjoining the shopping complex, multiple bus bays and shelters, and a remote sheltered stop for park & ride patrons.

## **58**. Construct a **Lansdale Transportation Center** at the existing R5 station by expanding the existing park & ride lot (+300 spaces), reconstructing the station, and adding bus bays.

**59.** North Philadelphia Transportation Center — restore deteriorated Amtrak station facilities and improvements to local streets. Encourage redevelopment of the station area.

**60.** Paoli Transportation Center — Relocate the Paoli Amtrak/Regional Rail station. Provide for improved parking, bus access and pedestrian travel at the station site.

**61. Radnor Transportation Center** — rehabilitate existing SEPTA R5 Radnor station and construct approximately 600 new parking spaces to serve the R5 and Route 100 stations and I-476.

**62.** Construct a new **Thorndale Train Station** with approximately 450 park & ride lot spaces to serve SEPTA's R5 Parkesburg line near PA 340.

## 63. Construct a West Chester Transportation Center with passenger amenities and bus bays.

**64.** Woodbourne Transportation Center — Provide 132 new spaces at US 1 and the SEPTA R3 Woodbourne Station.

### Between 2005 and 2020

New Jersey

**65.** Construct an Atlantic City Expressway Interchange with CR 689 (Berlin-Cross Keys Road).

## Pennsylvania

66. To serve the new office development occurring along the western portion of Market Street in Philadelphia, construct a Market West Subway Station in the vicinity of 20th-21st Street to provide access to SEPTA's Market-Frankford Line and the Subway-Surface system.

67. Create a Media Transportation

**Center** — Extend Route 101 Trolley line to the Media R3 station via Orange Street, remove rail siding and expand Media station parking, upgrade Media Station and Ridley Creek Roads, signalize Ridley Creek Road intersection with Baltimore Pike, and reroute 110 and 118 buses to serve the new center.

**68**. Develop the **Neshaminy Mall Transportation Center** — requires an integrated development and transportation plan. Interface SEPTA's proposed Street Road Bus Route (Ivyland to Neshaminy) for an additional circumferential bus route, provide additional support by installing transit passenger amenities at the center. Ideally, integrate the US 1 and I-276 interchange area park and ride lot (potential parking demand = 429 spaces) into the plan.

**69.** Provide an **Overbrook Transportation Center** along SEPTA's R5 Regional Rail line by extending the Route 10 subway-surface line to the Overbrook station.

#### SYSTEMWIDE IMPROVEMENTS

The following projects are not specific recommendations of the plan but are illustrative of the categories of lesser improvements to be pursued throughout the transportation system to improve conditions. Their individual air quality benefits, where appropriate, and implementation costs were taken into consideration in the analyses of the plan's recommendations.

### **Reconstruction of Major Facilities**

• Upgrade track and right of way from Winslow Junction to Lakehurst in advance of freight service restoration.

• Effect vertical and horizontal clearance improvements along southerly route to and from Philadelphia port facilities.

■ Regional Rail Mainline Wayne Junction to Glenside — This project will rehabilitate the northern portion of SEPTA's trunk line, which carries 30 percent of the daily Regional Rail ridership.

■ ADA Improvements Transit — Rail station improvements required to make stations handicapped accessible and purchase of paratransit vehicles and lift equipped buses.

■ PA 309 Corridor Improvements, Montgomery County — A series of projects will upgrade PA 309 in Montgomery County. On the Fort Washington Expressway, between Greenwood Avenue and Welsh Road (PA 63), pavement restoration and interchange upgrades will be completed. Between North Wales Road and the Sellersville Bypass, two TIP projects will result in shoulders, and a center turn lane being constructed.

### Transit Facilities, Vehicles and Services

Broad Street Subway — The signal system on the Broad Street Subway is scheduled to be replaced and modernized.

■ Market-Frankford Automatic Train Control — Purchase and installation of new automatic train control signal system.

■ Trenton/Morrisville Area Rail Yard — This project includes the design, engineering and construction of a new rail yard in the Trenton/Morrisville area. The new yard is essential for increasing the efficiency of NJ Transit's Northeast Corridor rail line, and would result in a reduction of operating costs for the service. Funding for this project is also programmed in the NJTPA TIP.

■ Institute an expanded waterfront trolley service along Columbus Blvd. and Front Street. This service should begin at the restored Route 15 LRT line, creating an additional intermodal connection at the Girard Market-Frankford Station. The service would then continue south on Columbus Blvd. below Reed Street to Snyder Avenue then via Snyder to the restored Route 23 LRT line. This route would then provide additional service on the southern portion of Route 23. This alignment leaves open the potential to provide one- or two-way loop service on 11th and 12th Streets and Girard Avenue.

■ Improve the R5 signal system and track from Lansdale to Colmar.

• Purchase 20 additional Broad Street Subway Cars to increase the line's capacity.

• Extend Warminster regional rail line from the Warminster station to Ivyland.

■ Improve transit service in the Trenton to Center City corridor by increasing train lengths on the R7 Regional Rail Line and restoring light rail service on SEPTA Routes 15 and 56.

■ Erie Avenue Subway Station — Engineering and intermodal improvements.

■ Harrisburg Rail Line Service — Lease two train sets, provide additional improvements to support rail passenger service between Harrisburg and Philadelphia.

■ City Hall Station — Conceptual engineering of City Hall Station which provides access to numerous locations in and around City Hall. Future funding will provide for final engineering and rehabilitation of the station.

■ Light Rail Transit Upgrade Route 60, 6 and 53 — Acquisition of trolleys and equipment.

■ Eastwick Rail Stations — Construction of new stations and associated parking.

■ RRD/Rail Transit Control Center — Development of master centralized control center for railroad, transit, and surface operations.

Midvale Bus Garage Construction — SEPTA plans to construct a garage for 275-300 advanced design standard and articulated buses on the site of the former Midvale/Heppenstal Steel Company. Besides the garage, the site will house peripheral operations, including fare collection and farebox repair, quality control operation, and a central tire shop for the City Transit and Suburban Transit Division bus fleets. The project includes construction of the bus garage and purchase and installation of the maintenance and service operations.

■ Extension of Route 66 Trolley — Extend service of the Route 66 trackless trolley in the northeast section of Philadelphia to the Franklin Mills shopping mall—a distance of approximately two miles.

 Suburban Station Improvements — Perform concourse and platform improvements.

■ Penn's Landing Ferry — Construct an enclosed passenger terminal.

## Park and Ride Lots

Construct park and ride lots at the following locations on US 130:

- interchange with US 206,
- NJ 73,
- Creek Road (CR 636), and
- interchange with NJ Turnpike.

• Locate satellite parking areas with express shuttle link to the PATCO Hi-Speed Line.

■ Increase the parking capacity at PATCO stations, most notably Woodcrest Station.

• Construct a park and ride lot at relocated NJ Tpk. Interchange #3, if found feasible.

• Construct a park and ride lot at NJ 55 and Deptford Center Road.

• Construct a park and ride lot near the intersection of NJ 38 and CR 541.

Construct park and ride lots at the following NJ Turnpike interchanges:

- I-195, and
- **US 206.**

Construct park and ride lots at the following I-295 interchanges:

- NJ 38,
- NJ 70, and
- NJ 168.

• Rehabilitate and increase parking capacity at SEPTA's West Trenton rail station.

■ Increase the potential of the existing R6 Norristown rail station at Conshohocken to attract park and ride users by improving the parking capacity of the station and providing guidance signs between the station and I-76 as well as I-476.  Improve access to intercity rail service by pursuing Amtrak service and separate parking arrangements at the SEPTA R2 Baldwin site.

 Improve carpool/vanpool capabilities through creation of a park and ride lot near the intersection of US 30 and US 202. Such a parking area should provide easy access to and from all arterial routes in this vicinity.

• Expand parking at the Norristown Transportation Center.

Construct park and ride lots at the following US 422 interchanges:

- Township Line Road in Limerick,
- Egypt Road in Upper Providence,
- Sanatoga Road in Limerick,
- PA 29 in Upper Providence, and
- PA 100 in North Coventry.

Construct park and ride lots at the following PA 9 (NE Extension) interchanges:

- PA 663/PA 9 in Milford Twp.,
- PA 63/PA 9 in Towamencin Twp..

Construct park and ride lots at the following locations on PA 309:

- PA 152 in Sellersville Borough,
- US 202 in Montgomery Twp..

• Expand parking at the Somerton Station on the R3 line. Integrate future development and transportation services to establish a transportation center at the station area.

■ Construct a park and ride lot near the interchange of PA 413 and I-95.

Construct the proposed I-476 park and ride lots. First priority should be given to lots serving SEPTA rail lines. The following locations have been identified:

■ *Baldwin:* I-95 at relocated SEPTA R2 Crum Lynne Station. The relocated Crum Lynne station platforms at Baldwin should be constructed south of the track interlockings in order to preserve access to the inner tracks for future enhanced express service opportunities negotiated with Amtrak.

 Wallingford: I-476 at relocated SEPTA R3 Wallingford Station,

■ *Baltimore Pike:* I-476 at Baltimore Pike with added SEPTA Route 101 stop,

West Chester Pike: I-476 at PA 3,

• *Radnor:* US 30 interchange with I-476 on the R5 Paoli line and the Norristown High Speed Line,

■ *Conshohocken:* I-476 at Matson Ford Road, and

 Plymouth Meeting: I-476 at Germantown Pike, Chemical Road and potential Cross County Metro route.

Construct park and ride lots at the following locations:

- I-95/PA 452 or Chichester Avenue,
- I-95/PA 420,
- US 322/PA 452,
- US 1/US 322, and
- US 202/PA 926.

• Construct additional off-street parking at 30th Street Station for short-term and long-term parking. Regional Rail Park and Ride Lot Program — Engineering and construction of park and ride lots at stations along the R3, R5 & R6 lines. The following stations have been identified by SEPTA for park and ride lots: Forest Hills on the R3 West Trenton line; Elwyn on the R3 Media/West Chester line; Colmar, Doylestown, and Fort Washington on the R5 Lansdale/Doylestown line; Devon, Malvern, and Whitford on the R5 Paoli/Parkesburg line; and Spring Mill on the R6 Norristown line.

■ Intermodal/Park and Ride Facilities— Engineer and construct park and ride lots at regional rail stations near I-95 & I-476 interchanges . Lots programmed include Woodhaven Road and the Cornwells Heights Station on the R7 Trenton line; Main Street and the Yardley Station; Bristol Road near US 1 and the Neshaminy Falls station; Street Road, PA 132, west of US 1 and the Trevose station; US 1 and the Woodbourne station; and the vicinity of PA routes 63 and 532 and the Philmont station on the R3 West Trenton line.

#### Ramp Construction

• Construct a full interchange between US 130 and NJ Turnpike. Reconstruct interchange ramps to make a more direct connection.

• Upgrade NJ 55 interchange at Deptford Center Road to permit all turning movements.

■ I-295 — Interchange Improvements Exits 14 to 20 — Reconstruction of the segment between Delsea Drive (NJ 47) and Church Street in West Deptford Township was completed FY 93. The programmed improvements will relocate interchanges, upgrade ramp designs, and lengthen acceleration and deceleration lanes to meet interstate design standards.

■ PA 611 (Broad Street) — Realignment of the interchange at I-76 in South Philadelphia.

 Broad Street — Ramp construction at PA 611 in Doylestown.

• Other I-95 Improvements — Interchange improvements include ramp construction at PA 332 in Bucks Co. and PA 352 in Delaware Co. and lighting installation at PA 420 in Delaware Co. Restoration of the facility's pavement in Bucks County is also scheduled.

■ I-76, Schuylkill Expressway on- and off- ramp construction at Henderson Road.

■ PA 100 Improvements — The focus of this group of projects is to improve the signalized intersections through signal improvements and the addition of turning lanes. The construction of a new northbound off-ramp and the extension of acceleration and deceleration lanes will provide better access to PA 724.

■ Provide a full interchange at I-95/295 and NJ 31.

■ Upgrade the US 1/PA 352 interchange to a full cloverleaf design. Provide two through lanes per direction on PA 352 in this vicinity.

#### APPENDIX B

• Construct a ramp from westbound Baltimore Pike to northbound Media Bypass.

 Install weaving ramps at Kerlin Street to/from I-95 north (integrate with I-95 Intermodal Project)

## Advanced Signal Systems and Signing

 Replace pedestal mounted traffic signals with overhead mounted signals on arterial routes in Chester and West
 Philadelphia. Provide for improved signal coordination and transit vehicle override (as appropriate) with replacement.

■ Install a closed loop traffic signal system on US 130 in Burlington City connecting Keim Blvd., Mott Avenue (CR 632), High Street (CR 541), Jacksonville Road (CR670/CR 541 Truck). The Burlington-Bristol Bridge should be interconnected with the signal system to trigger warning signs of bridge openings.

 On US 30, provide turn lanes at signalized intersections and interconnect traffic signals to improve traffic flow between CR 686 (Gibbsboro Road) and US 130.

■ Interconnect traffic signals and add turn lanes along CR 561 between NJ 154 and CR 673.

• Add left turn lanes at all signalized intersections and interconnect signals on NJ 168 from Evesham Road to US 130.

■ Interconnect traffic signals for progressed traffic flow along PA 611 from

Bristol Road south to Broad Street (within the Philadelphia city limits), provide bus pull-outs and shelters at major transit loading points.

■ Interconnect traffic signals for progressed traffic flow along PA 263 from Bristol Road south to PA 611, provide bus pull-outs and shelters at major transit loading points.

■ Interconnect traffic signals for progressed traffic flow along Easton Road from PA 611 to Cheltenham Avenue, provide bus pull-outs and shelters at major transit loading points.

 Interconnect traffic signals for progressed traffic flow along Cheltenham Avenue/Broad Street from Easton Road to Broad Street.

• Provide a coordinated signal system along Bustleton Avenue.

Interconnect traffic signals along PA 73 within the Philadelphia city limits (Cottman Avenue). Close/consolidate access points to the Cottman Avenue portion of the corridor.

■ Interconnect traffic signals for progressed traffic flow along PA 3 from 69th Street to PA 252.

 Interconnect traffic signals for progressed traffic flow along PA 291 from US 13 to Philadelphia City Limit.

 Interconnect traffic signals for progressed traffic flow along Baltimore Pike from Ashland Avenue to Church Lane.

## Intersections and Spot Locations

• Construct new access road and repair rail access to Broadway Terminal.

• Expand terminal entrance and repair main rail spur leading into Beckett Terminal.

• New Jersey Port Terminal Capacity Extensions at facilities west of Ferry Avenue.

Improve rail access into and out of South Philadelphia terminals and facilities, such as AmeriPort and Packer Avenue Marine Terminal. Improvements must address operational bottlenecks and through lines between the ports and southbound and westbound routes.

 Provide a new access road to serve freight facilities at Philadelphia International Airport.

Provide a rail spur and siding to Pier
98 Annex.

■ NJ 31 Improvements — NJ 31 will be reconstructed including curbing and shoulders. Three jughandles will be constructed between I-95 and the Pennington Circle. The circle will be cut through and new signalization will be installed. The highway will be widened from two to four travel lanes from the circle to south of the Conrail overpass. ■ Collingswood Circle (US 30/US 130) Cut-Through — This project will cut through the Collingswood Circle and reconstruct a 0.7 mile segment of US 130 from south of the circle to the Cooper River. The segment of US 130 from the Cooper River to north of the Airport Circle is presently undergoing reconstruction, and a cut-through of the Airport Circle is nearing completion. This project is a continuation of the current construction program.

■ US 30 Improvements — These projects improve traffic flow at isolated locations throughout the corridor by reducing congestion at intersections through signal improvements and construction of turn lanes. Construction of a pedestrian underpass is also included in the vicinity of Villanova University. In Chester County, the bridge in front of the Exton Mall will be replaced and a new eastbound loop off ramp is also programmed from US 30 Bypass onto NB PA 113.

■ PA 29 Improvements — Two of these projects improve traffic flow at isolated locations in the corridor through signal and intersection improvements and the construction of a new US 422 SB on-ramp in Montgomery County. The third project proposes to replace a bridge over the Schuylkill River.

Preserve capacity of US 30/PA 100 intersection by creating a ring road for all major nearby commercial properties in all four intersection quadrants. • Convert one EB lane of US 322 to an HOV bypass lane between PA 452 and I-95.

• Address turn radius, weaving and capacity problems on Matson Ford Road in the Plymouth/Conshohocken area.

■ PA 113 Improvements — Two very different strategies are pursued to address the congestion. The Chester County projects proposed intersection improvements and minor widening while the Montgomery County projects suggest constructing two lane relocations to bypass congested villages.

■ PA 463, Horsham Road — Widen to four lanes from PA 611, Easton Road to Norristown Road.

■ PA 52 — Two lane relocation between PA 926, Street Road and Kennett Pike.

### Access Controls

• Access management is required along US 130 and NJ 33.

• Access management is required on US 130 between Airport Circle and the Conrail Line (Delair Bridge). This improvement should be coordinated with the reconstruction of US 130.

■ Apply access management techniques to US 130 from the vicinity of Millside Shopping Center to Creek Road (CR 636) and from Delanco Road (CR 624) to the Willingboro/Burlington Line.  Consolidate access points along NJ 38 and Haddonfield Road in Cherry Hill Township where shared drives are possible.

■ NJ 41 Improvements — Dualization of this road will provide a much needed increase in capacity. Other improvements include provisions for left turn lanes, intersection improvements at Deptford Center Road and Clements Bridge Road and relocation and/or additional connecting ramps from NJ 42 freeway.

■ Initiate access controls on CR 541 between I-295 and CR 630.

■ Initiate access controls on CR 541 in Mt. Holly from CR 630 to CR 541 Spur.

 Consolidate driveway and median openings, construct acceleration and deceleration lanes and interconnect signals on NJ 42 between NJ 168 and CR 655 (Fries Mill Road).

Close access points along NJ 73 in the vicinity of Moorestown where shared drives are possible.

• Consolidate difficult, unsignalized intersections and/or movements in Bordentown.

■ Implement an entrance consolidation plan for Baltimore Pike between PA 420 and Bishop Avenue in consultation with the affected businesses and neighborhood organizations. The plan should provide for closure of selected side streets, replacement of the continuous center turn lane with a median where allowable, installation of bus turnouts, and a coordinated signal system and other traffic flow improvements as identified. A program of uniform business and roadway signing adjacent to the travel lanes should also be conducted.

 Improve traffic flow and safety near SEPTA's Morton Station: Realign Morton Avenue south of US 420 to a new signalized intersection with Franklin Avenue; realign Yale Avenue to connect with Mitchell Avenue; grade-separate PA 420 at Morton Station. Provide sidewalks and ramping to change between inbound and outbound platforms at the station. Install barrier fencing to prevent pedestrians from crossing tracks in the station area. Close the Amosland Road grade crossing. Provide a new connection between Church Road and PA 420 near Walnut Street. Close the Church Road grade crossing.

■ Improve traffic flow and safety at SEPTA's Primos Station by grade separating Oak Lane and SEPTA's R3 Regional Rail Line. Provide sidewalks and stairwells to change between inbound and outbound platforms at the station. Install barrier fencing to prevent crossing tracks in the station area.

■ Implement traffic flow and access management improvements on US 322 between US 30 and Amtrak/SEPTA R5 line.

Pursue access management programs for the Pottstown to King of Prussia corridor for PA 23, PA 100, PA 113 and PA 724. ■ Pursue highway access management strategies as development proceeds along PA 611 and PA 263 north of Bristol Road Strategies to manage or control access include dividing the highway, consolidating access points and establishing minimum driveway and signalized intersection spacing standards. A design study should be undertaken first so that a plan can be developed and assessed prior to implementation.

 Access management is required along the Cottman Avenue shopping district. Intersection improvements are required at Cottman & US 1 and Cottman and Bustleton Avenues.

■ Pursue access management strategies along PA 532 (Bustleton Pike) — Consolidating driveways north of Byberry Road to reduce the frequency of turning points, establishing minimum spacing criteria between traffic signals and interconnecting traffic signal operation are likely candidate strategies to improve traffic flow.

 Apply access management techniques to US 30 Bus., PA 100, US 202, US 322 and PA 926 in the Chester to Exton/
 Downingtown corridor.

■ The Philadelphia Streets Department is working with PennDOT to develop the initial stages of an advanced electronic traffic control system. The Center City traffic system should be expanded throughout Center City (as an ongoing activity).

#### **Congestion Management Systems**

• Continue to develop electronic toll collection technology for toll facilities.

■ Traffic Operations Center — Burlington, Camden, & Gloucester Counties — Develop and implement stateof-the-art traffic management techniques in the South Jersey area, including a traffic operations center, incident management and mitigation, highway courtesy patrols, highway advisory radio, operation and maintenance of computerized traffic signals, traffic surveillance, variable message signs, and other techniques.

■ Expand the TIMS program to the Schuylkill Expwy., PA Tpk. and limited access portions of US 202. The TIMS program incorporates variable message signs, incident detectors, closed circuit television (CCTV), and ramp metering into a comprehensive incident management program directed by Penn DOT's traffic operations center. TIMS program work should be coordinated with SEPTA, DRPA and other affected agencies as appropriate.

■ Apply access management techniques to US 1, US 3, US 30, PA 291 and US 322 in Delaware County.