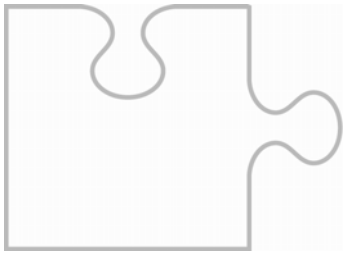
CONNECTIONS

THE REGIONAL PLAN FOR
A SUSTAINABLE FUTURE

THE LONG-RANGE PLAN FOR THE GREATER PHILADELPHIA REGION

DELAWARE VALLEY
dvrpc
REGIONAL
PLANNING COMMISSION



The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals and the public with a common vision of making a great region even greater. Shaping the way we live, work and play, DVRPC builds consensus on improving transportation, promoting smart growth, protecting the environment and enhancing the economy. We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia Region - leading the way to a better future.

The symbol in our logo is adapted from the official DVRPC seal 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. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

DVRPC is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for the findings and conclusions herein, which may not represent the official views or policies of the funding agencies.

DVRPC fully complies with Title VI of the Civil Rights Act of 1964 and related statutes and regulations in all programs and activities. DVRPC's website may be translated into Spanish, Russian and Traditional Chinese online by visiting www.dvrpc.org. Publications and other public documents can be made available in alternative languages and formats, if requested. For more information, please call (215) 238-2871.

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Executive Summary

Connections: The Regional Plan for a Sustainable Future, adopted by the DVPRC Board on July 23, 2009, is a blueprint for the future growth and development of the Greater Philadelphia region, with an emphasis on the transportation system. The *Connections* Plan identifies four integrated principles to achieve a sustainable future by 2035.

Manage Growth and Protect Resources

There are just over one million acres of undeveloped, unprotected land remaining in the region, and the *Connections* Plan proposes protecting one-half–500,000 acres–by 2035. This open space system will enhance environmental quality, improve and maintain surface water quality, provide abundant passive recreational opportunities, strengthen the region's agricultural industry, better define communities by creating greenbelts, eliminate the need to extend costly infrastructure into rural areas, and help to revitalize cities and towns. This target can be achieved by focusing new development as infill and redevelopment in existing developed areas, and by targeting new development to designated Future Growth Areas.

Develop Livable Communities

Another key principle is to create and support livable communities in appropriate locations throughout the region. Livable communities can be found in the region's core cities and their component neighborhoods; in the region's older first suburbs; and in town and rural centers scattered throughout the region's suburbs and exurban areas. These centers provide a focal point in the regional landscape that can reinforce or establish a sense of community for local residents. Centers serve as a basis for organizing and focusing the development landscape, while coordinating the more efficient provision of supportive infrastructure systems, including water, sewer, and transportation. By concentrating new growth around and within the over 100 centers identified in *Connections*, the region can both preserve open space and reduce infrastructure costs. The densities and mixed uses inherent within centers can enhance the feasibility of walking, bicycling, and public transit as alternatives to the automobile.

Build an Energy-Efficient Economy

Over the coming decades, a profound transformation to the global economy will require it to use less energy and produce less greenhouse gas. This presents a tremendous opportunity for Greater Philadelphia. As we transform our land use to build on our historic advantages of mixed-use development and transit infrastructure, we will provide opportunities for transforming our business and workforce infrastructure to provide the products, services, and skills required for this future. This transformation will require regional cooperation and strong coordination between the states, counties, and municipalities. A key component of this strategy is reducing regional greenhouse gas emissions by 50 percent by 2035 compared to 2005 levels.

Establish a Modern, Multimodal Transportation System

The future transportation system will need to serve different modes, and *Connections* includes specific policies for each. The emphasis now and in the future is not on building new roads, but on making the roads and other facilities that we have perform better. Therefore, the top priority for transportation investments is the maintenance and modernization of the existing transportation system. The second-highest priority is to improve the operation of the existing network through technological improvements and

demand management strategies. The third priority is increasing the capacity of the existing multimodal transportation system through the elimination of critical bottlenecks and better linking existing facilities. The *Connections* Plan puts forth a challenge to increase local funding for transportation infrastructure by $100 million a year to align the Greater Philadelphia region with other peer metropolitan regions across the country.

Transportation Investments

The *Connections* Plan includes a fiscally constrained set of transportation investments that seek to implement the various goals of the Plan. Federal and state funding allocation formulas, along with anticipated local match requirements, were used to develop the revenue estimates for the *Connections* Plan. The *Connections* Plan anticipates $64.8 billion in year-of-expenditure dollars in total federal, state, local, and Small and New Starts funding over the life of the 26-year Plan, with 58 percent of the total allocated to highway projects and 42 percent allocated to transit projects on a regional basis.

Needs Assessment

DVRPC worked with its partner operating agencies to develop a full needs-based estimation, based on asset management system analysis, for all transportation infrastructure in the region. This assessment clearly highlights the significant gap between anticipated revenue and what it would cost to address the set of needs. The Pennsylvania subregion's funding gap is estimated at $36.4 billion over the life of the *Connections* Plan, and the total New Jersey subregion's funding gap is estimated at $9 billion over the life of the *Connections* Plan.

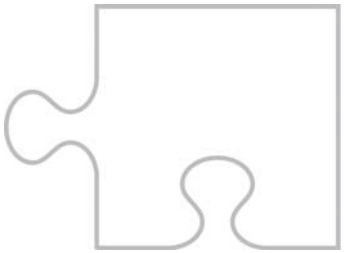
Following the lead of both state departments of transportation, the *Connections* Plan pursues a policy to "fix-it-first," which prioritizes funding to maintaining the existing roadway and transit networks. The goal is to achieve and maintain a state of good repair for existing transportation infrastructure before undertaking significant expansions to the system. Almost 75 percent of anticipated revenues have been allocated to rebuilding the highway and transit infrastructure in the region, and funding for new highway capacity is capped at 10 percent of total highway revenues. Unfortunately, this amount does not come close to fully addressing the identified need.

Closing the Funding Gap

Federal and state funding levels are not expected to increase, and the region's local funding contribution is lower than other large metropolitan areas across the country. Recognizing these issues, DVRPC has formulated a list of local funding options that could be used to finance improvements to the region's transportation system. During the extensive public outreach conducted as part of the development of *Connections*, DVRPC outlined the challenge to increase local funding for transportation investments. Participants at workshops and in focus groups spoke of the region's transportation system as a shining asset and also agreed that rebuilding the system should be the top transportation priority. However, they also noted that it will take a lot of money to accomplish this goal. The *Connections* Plan does not advocate any particular local funding alternative, but instead issues a challenge to the region's leaders, stakeholders, and citizenry to reach consensus on new local and regional means to maintain and modernize the region's critical transportation infrastructure, which impacts both our standard of living and our economic competitiveness.

CHAPTER 1

Introduction



As a region, Greater Philadelphia enjoys many advantages, including a relatively low rate of transportation congestion; a superb transit network; a location in the middle of the Northeast Corridor; many traditional hometown communities; an affordable standard of living; a popular and growing park and trail system; numerous institutions of higher learning and advanced medical care; and abundant historical, cultural, natural, and scenic resources. At the same time, we face notable challenges, such as increasing sprawl; a decreasing amount of open space; pockets of poverty, unemployment, and racial or ethnic segregation; a spatial mismatch between workers and jobs; disinvestment in many older centers; and an aging infrastructure that requires extensive and expensive reinvestment.

Connections: The Regional Plan for a Sustainable Future, adopted by the DVPRC Board on July 23, 2009, outlines a vision for the future of the Greater Philadelphia region. The vision takes into account a number of present-day factors that will have a significant impact on the future form of the region. These factors include increasing energy prices and declining oil supplies, a rapidly evolving global economy, and the impacts of climate change.

The concept of sustainability is a key policy principle that is woven throughout the Long-Range Plan. Sustainability refers to the ability of a region to meet the needs of the present without compromising the ability of future generations to meet their own needs.[1] The Plan sets a number of goals to ensure a sustainable future and outlines what investments and policy steps that the region will need to make over the span of the Plan to achieve the vision.

What is the DVRPC?

The Delaware Valley Regional Planning Commission (DVRPC) is the federally designated Metropolitan Planning Organization (MPO) for the nine-county Greater Philadelphia region, which includes: Bucks, Chester, Delaware, Montgomery, and Philadelphia counties in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. DVRPC's mission is to build consensus on improving transportation, promoting smart growth, protecting the environment, and enhancing the economy. DVRPC is governed by an 18-member board composed of state, county, and city representatives from its member governments, as well as various participating, nonvoting members and federal agency observers.

As the MPO for the Greater Philadelphia region, DVRPC is required by the U.S. Department of Transportation, in accordance with the planning

[1] World Commission on Environment and Development. Brundtland Commission. 1989.

The DVRPC Region

Source: DVRPC 2009

regulations of the Safe, Accountable, Flexible, Efficient Transportation Act–A Legacy for Users (SAFETEA-LU), the current federal surface transportation act, to develop a long-range transportation plan that covers a minimum 20-year time span. This Long-Range Plan helps guide the prioritization and funding of transportation investments for the region, which is another key responsibility for MPOs. The *Connections* Plan fully embodies the mission of DVRPC and serves as a mechanism for advancing the mission. The *Connections* Plan expands beyond the traditional long-range transportation plan to also encompass land use, economic competitiveness, and environmental issues. The Plan encompasses all of these factors because transportation does not stand alone, but is affected by and affects each of these other components. Land development creates transportation demand, and the transportation system shapes subsequent land use and influences a host of environmental elements. The region's economic competitiveness in the global marketplace is also impacted by its transportation infrastructure. The *Connections* Plan is built around a policy framework that addresses transportation, land use, the environment, and economic competitiveness. It encompasses the linkages, or connections, between each of these four elements.

What is the *Connections* Plan?

The *Connections* Plan serves many different purposes. It is the basis for the region's Transportation Improvement Program (TIP), which prioritizes transportation projects for federal funding. It is used to evaluate the consistency of public sewer and water investments with the designated growth areas in the Plan. It identifies large landscapes that are important to preserve for natural resource protection and agricultural retention. Above all, it serves as a collective vision across municipal and county boundaries for how the region should look and function in the future. To accomplish this, the *Connections* Plan addresses eight planning factors that MPOs are required to consider in long-range plans. They include:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for all motorized and nonmotorized users;
- Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and nonmotorized users;
- Increase accessibility and mobility of people and freight;
- Protect and enhance the environment, promote energy conservation, improve quality of life, and promote consistency between transportation

improvements and state and local planned growth and economic development patterns;

- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

As part of a federally designated air quality nonattainment area, DVRPC is required to update the region's Long-Range Plan every four years. The *Connections* Plan serves as an update to the existing *Destination 2030* Long-Range Plan, which was adopted in May 2005. The *Connections* Plan extends the horizon year of Greater Philadelphia's Long-Range Plan to 2035, while continuing the vast majority of the policies contained in *Destination 2030*. However, the *Connections* Plan also introduces several new elements to the long-range planning process, such as climate change and energy initiatives, local food production, and cultural and historic landscapes, which heighten the linkages between land use, the environment, the region's economic competitiveness, and the transportation network. It also includes a more robust project evaluation procedure and a quantitative assessment of the region's transportation needs over the 26-year time span of the Long-Range Plan.

Predicting the future, particularly over a 26-year time span, is virtually impossible. Any number of different events can impact the future form of the region, and many are not even on the horizon. The strategies contained in the Long-Range Plan are based on commonly accepted and documented trends and forecasts, but are augmented by specific policy decisions in order to attain the region's collective vision for the future. The *Connections* Plan attempts to strike a balance between planning for current needs, such as reducing congestion on the region's roadways, and formulating strategies that accomplish such goals in as sustainable a manner as possible. One of the primary reasons that the U.S. Department of Transportation requires MPOs to update long-range plans every four years is to monitor trends and make adjustments to policies as appropriate.

Stakeholder and Public Outreach

The *Connections* Plan was developed in conjunction with many stakeholders and strives to be consistent with and complementary to the goals and policies of the plans and programs of DVRPC's member municipal and county governments, the policies of the *New Jersey Statewide Development and Redevelopment Plan*, and the statewide transportation plans of the Pennsylvania and New Jersey departments of transportation.

Long-range planning is a collaborative process that involves close working relationships with the aforementioned member governments, departments of transportation, and three public transit agencies. DVRPC convenes a number of committees, consisting of citizens and agency and organization representatives in specific fields, including the: Regional Citizens Committee; Regional Aviation Committee; Transportation Operations Task Force; Central Jersey Transportation Forum; Planning at the Edge Advisory Committee; Goods Movement Task Force; Regional Community and Economic Development Forum; Regional Transit Advisory Committee; and Information Resources Exchange Group. Much of this Plan was formalized with contributions from each of these groups. Other collaborators included the: Pennsylvania Department of Conservation and Natural Resources, Pennsylvania and New Jersey departments of environmental protection, Pennsylvania Environmental Council, Natural Lands Trust, South Jersey Land and Water Trust, Greenspace Alliance, Montgomery County Lands Trust, Heritage Conservancy, New Jersey Conservation Foundation, Rancocas Conservancy, Partnership for the

Delaware Estuary, Philadelphia Water Department, Schuylkill Action Network Land Protection Collaborative, New Jersey Bicycle Advisory Council, Southeastern Pennsylvania Bicycle Task Force, New Jersey Pedestrian Task Force, and Philly Walks.

DVRPC developed this Plan through an extensive public outreach campaign to stakeholders and the public. Public participation is an integral part of the long-range planning process, allowing stakeholders and residents to learn about issues facing the region and participate in the creation of the Plan. The Regional Citizens Committee (RCC) is the primary vehicle for ongoing public participation in DVRPC's activities. With representatives from the private sector, social service agencies, environmental organizations, and other interested parties, the RCC reviews and comments on all issues and plans that are acted upon by the DVRPC Board.

During the development of the *Connections* Plan, DVRPC undertook a number of outreach activities to gather public input. The purpose of these outreach activities was to give the people who live and work throughout the Greater Philadelphia region an opportunity to share their vision of the region's future and to provide input as to how they would like to see the region grow and prosper. DVRPC used diverse outreach strategies to capture the many concerns and recommendations of the region's residents, government officials, and stakeholders. Special emphasis was put on attracting individuals and organizations that have not participated in previous DVRPC planning exercises, as well as those representing environmental justice concerns and underserved communities.

DVRPC began this campaign with an extensive online survey to identify the types of issues that were priorities for the citizens of the region. Staff then analyzed and used the survey results to develop key Plan principles to drive the development of the Long-Range Plan. The key Plan principles were presented to multiple focus groups comprised of members of the general public, municipal officials, and other stakeholders who have an impact on the growth and development of the region. Their input helped identify particular issues and constraints that would impact the implementation of the key Plan principles. Finally, a series of workshops was conducted in each of the region's nine counties to collect the public's opinion on the Plan's principles and vision. The ideas, concepts, and feedback received during the public comment period helped to refine the vision and policies put forth in the Plan.

Environmental Justice

Title VI of the Civil Rights Act of 1964 states that "no person in the United States shall, on the grounds of race, color, or national origin, be excluded from the participation of, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Building on this framework, Executive Order 12898 mandates that federal agencies incorporate environmental justice considerations and analysis in their policies, programs, and activities. Environmental justice (EJ) is the fair treatment and meaningful involvement of all people, regardless of religion, race, ethnicity, income, or education level, in the planning and decision-making process. To meet the requirements of these laws, an MPO must:

- Enhance its analytical capabilities to ensure that the long-range plan and the TIP comply with Title VI;
- Identify residential, employment, and transportation patterns of low-income and minority populations so that their needs may be identified and addressed, and the impacts of transportation can be fairly distributed; and
- Evaluate and, where necessary, improve the public involvement process to eliminate barriers and engage minority, disabled, elderly, and low-income populations in regional decision-making.

DVRPC is mandated by these federal regulations to ensure nondiscrimination in all of its programs and activities and ensure that transportation and regional planning is done in an open, accessible way for

all residents and stakeholders. A commitment to Title VI and EJ has, and continues to be, reflected in DVRPC plans and programs, public involvement effort, and general way of doing business. DVRPC has created an internal technical methodology, the Degrees of Disadvantage (DOD), to identify disadvantaged populations within the Greater Philadelphia region. DVRPC's DOD methodology:

- Identifies groups that may be negatively impacted;
- Locates them in the region;
- Plots key destinations, such as employment or health care locations, that need to be accessed;
- Acknowledges nearby land use patterns;
- Overlays these destinations with the region's existing and proposed transportation network; and
- Determines what transportation service gaps exist for these disadvantaged groups.

EJ is traditionally concerned with the impacts of disparate funding and services on defined minority and low-income groups. DVRPC currently assesses the following populations, which may have unique planning-related challenges, using 2000 U.S. Census data:

- Poverty;
- Carless Households;
- Non-Hispanic Minority;
- Physically Disabled;
- Hispanic;
- Limited English Proficiency;
- Elderly; and
- Female Head of Household with Child.

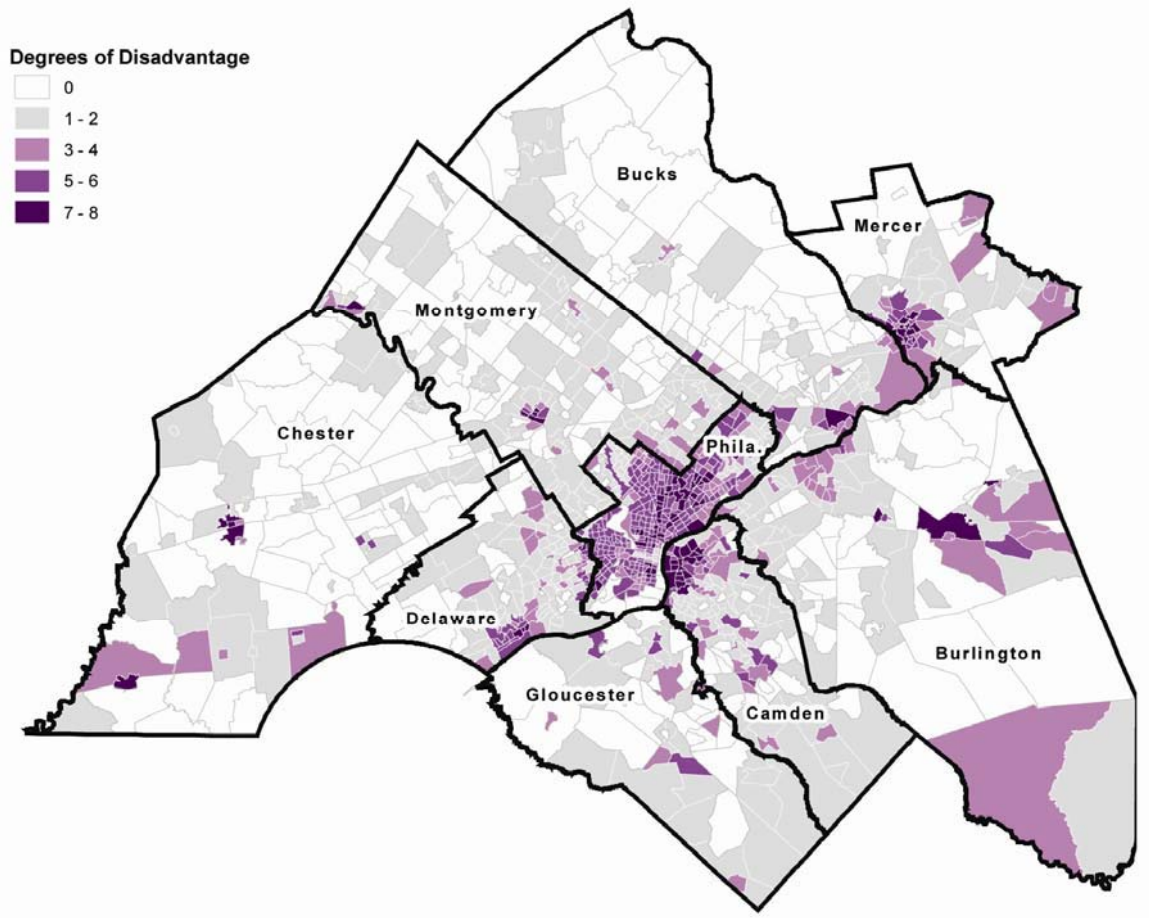
The EJ Map shows concentrations of disadvantaged populations in the nine-county region, with categories of zero DOD, one to two DOD, three to four DOD, five to six DOD, and seven to eight DOD. Of the region's 1,378 census

tracts, 76 percent have at least one DOD, which is not surprising given the multiple demographic categories present in the DOD methodology. Over one-quarter of the census tracts contain five to eight DOD. These areas are recognized as potentially being highly disadvantaged. Extra care and analysis should be taken when projects or programs occur within these areas.

The DOD methodology is an integral tool that is used to understand the region's demographics. This information is used for a variety of DVRPC programs and plans to analyze impacts, recommend solutions that may mitigate adverse project or program consequences, or to direct public outreach efforts. Additionally, the DOD methodology is one of the criteria utilized for evaluating fixed-guideway transit projects considered for inclusion in the Plan, with the intent to highlight those projects that provide the greatest benefit for EJ communities.

The work undertaken by DVRPC inherently includes opportunities for EJ considerations and to promote an open public participation process. Specifically, programs such as the Coordinated Human Services Transportation Plan, the Air Quality Partnership, and the Transportation and Community Development Initiative (TCDI) are designed to positively affect various groups and communities throughout the region.

The concept of creating a sustainable future is one that can particularly benefit EJ populations, and many of the goals presented in the *Connections* Plan highlight DVRPC's commitment to EJ and planning for all residents of the nine-county region. In the following pages, goals related to food systems, investing in the region's centers, promoting affordable and accessible housing, green infrastructure, economic and workforce development, and maintaining the region's transportation infrastructure for all users are interrelated and can have far-reaching benefits for the identified populations in the DOD methodology. Policies that promote urban agriculture, increasing the stock of affordable housing near employment centers, revitalizing brownfields and greyfields, creating jobs that match the workforce supply, increasing mobility and accessibility in the region's transportation system, and upgrading bicycle and pedestrian facilities, are just a few recommendations to improve the quality of life for all residents.



Source: DVPRC 2009

CHAPTER 2

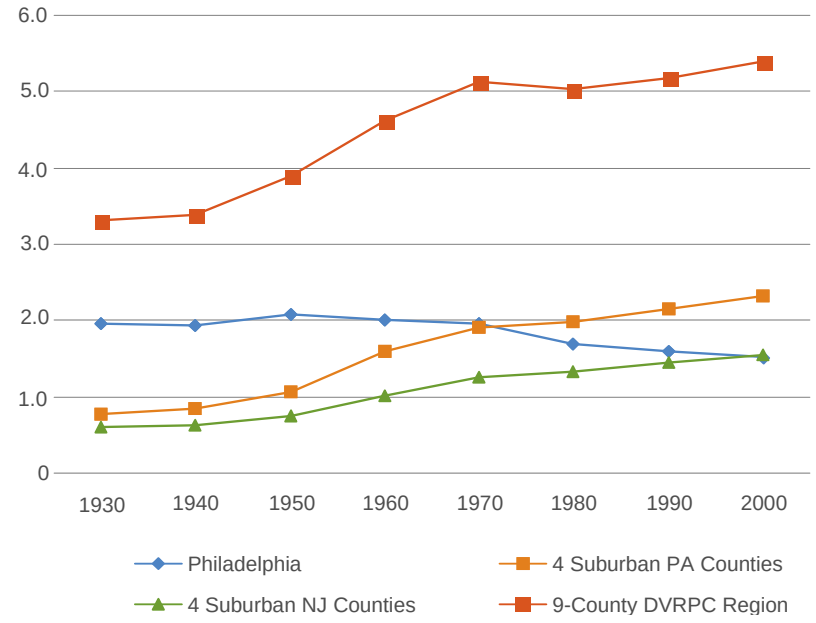
Trends and Forces

A long-range plan defines a future vision for the region and develops goals and strategies to attain that vision. The first step in developing a vision for the future is analyzing past trends, current conditions, and future forecasts. How many people live here? And how many new residents can we expect in the future? Where are they living? And in what types of communities? How many jobs are there in the region? And where are those jobs located? How do people travel to work and other desired locations? And how do needed goods move in and out of the region? Analysis of these and many other indicators highlight the region's relative strengths and weaknesses, which can then be perpetuated or countered through Plan policies.

Population

The population of Greater Philadelphia grew rapidly during the 20th century. In 1900, there were approximately two million people living in the nine-county region. At that time, over 65 percent of those two million people resided in the City of Philadelphia. By the year 1950, the region's population had doubled to around four million people, and the city reached its population apex of over two million people. Fifty years later, the region had approximately 5.4 million residents, while the city contracted to a little less than 1.5 million people.

Regional Population: 1930-2000 (Millions)



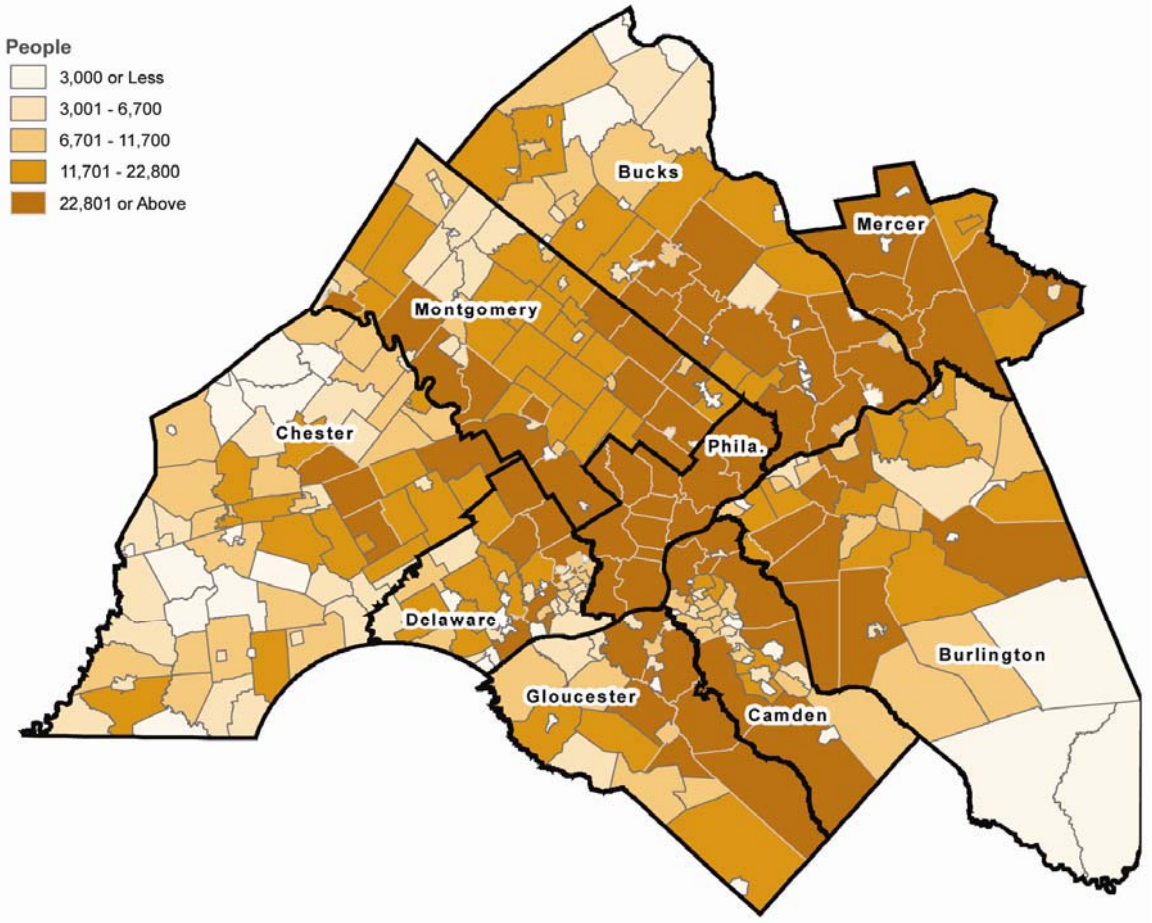
Source: U.S. Census Bureau 1930-2000

Between 1930 and 2000, the nine-county DVRPC region gained almost 2.1 million new residents. Most of this growth took place between 1940 and 1970, when the region's population increased by over 50 percent. This growth occurred primarily in the suburbs. By 1970, the four suburban Pennsylvania counties had approximately the same number of residents as the City of Philadelphia. The decades between 1970 and 2000 can be characterized more as a period of population shift rather than growth. During these three decades, the region gained less than 260,000 people overall (an increase of only five percent), despite significant increases in many suburban municipalities. Changes in regional demographics resemble a doughnut, with communities in the center of the region losing jobs and people (the "doughnut hole"), and the suburban communities surrounding the region's core gaining jobs and people (the "doughnut").

Population Forecasts

Population forecasts are a critical component of long-range planning. The forecasts for the *Destination 2030* Plan, adopted in February 2005, were based on data from the 2000 decennial Census. The first step in developing forecasts for 2035 was to develop and reach agreement with DVRPC's member counties on the estimated population and employment in 2005 to be used as a base for the 30-year forecast through 2035.

2035 Municipal Population Forecast



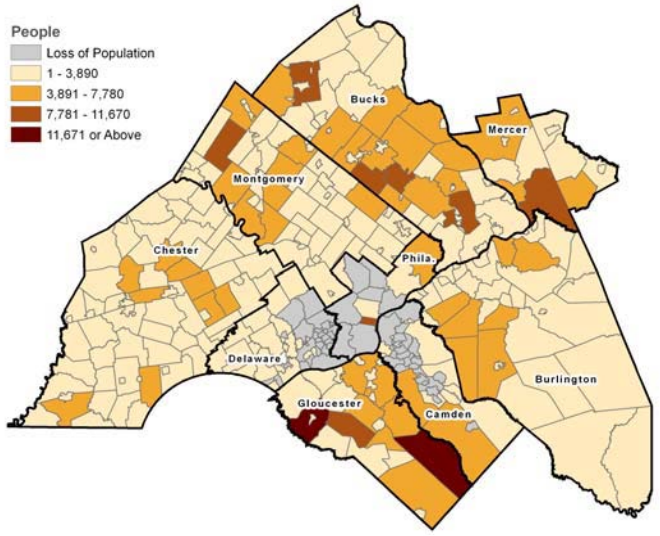
Source: DVRPC, U.S. Census Bureau

Population forecasting at the regional level involves the review and analysis of four major components: births, deaths, migration, and changes in group-quarter populations (i.e., dormitories, military barracks, prisons, and nursing homes). DVRPC uses the cohort survival concept (based on 2005 population estimates) to age individuals and project the flow of people. DVRPC also relies on its member counties to provide feedback on the population forecasts and information on any known, expected, and/or forecasted changes in group-quarter populations. County and municipal population forecasts in five-year increments through 2035 for the region were adopted by the DVRPC Board in July 2007.

In 2005, there were over 5.5 million people living in the nine-county DVRPC region. By 2035, more than 6.1 million people are expected. This represents an 11 percent increase over the 26-year life of the *Connections* Plan. The City of Philadelphia has experienced a continual decline in population since 1950, but the population loss has been less drastic in recent years, and population is projected to remain steady, at just over 1.475 million over the life of the *Connections* Plan. The share of the region's population living in Philadelphia, however, is expected to decline from 27 percent in 2005 to 24 percent by 2035, due primarily to continuing population growth in the suburbs. Like Philadelphia, Delaware and Camden counties are projected to hold steady at their current population levels.

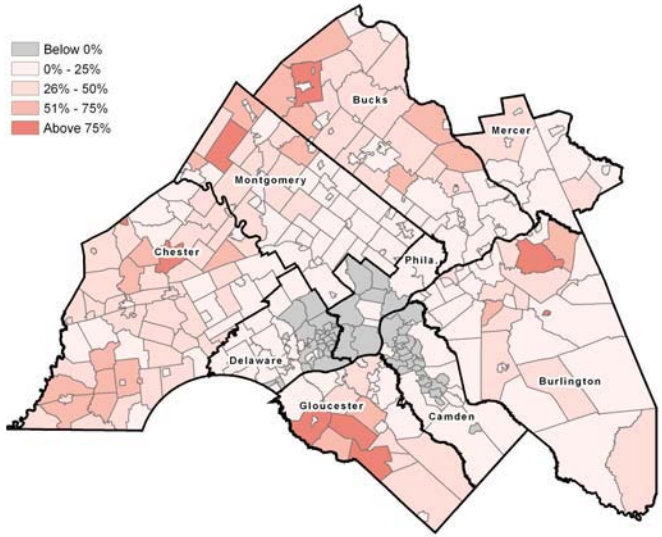
The largest percent increases in population between 2005 and 2035 are forecast in Gloucester County in New Jersey and Chester County in Pennsylvania, at 35 percent and 31 percent, respectively. The largest absolute increase in population is forecast for Chester County, which is expected to gain almost 149,000 residents and surpass Delaware and Camden counties by 2035 to become the region's fourth most populous county. Other counties forecast to see a significant

2035 Municipal Population Forecast Absolute Change: 2005-2035



Source: DVRPC, U.S. Census Bureau

2035 Municipal Population Forecast Percent Change: 2005-2035



Source: DVRPC, U.S. Census Bureau

number of additional residents include Bucks County (forecast to gain over 129,000 residents) and Montgomery County (with a forecasted increase of over 113,500 people). Municipalities forecast to experience a decline in population include the region's core cities, older boroughs, and first generation suburbs located in the center of the region. The fastest-growing municipalities tend to be toward the edge of the region.

An important demographic trend that is expected to accelerate over the life of the Plan is the aging of the region's population. The number of elderly residents has increased dramatically throughout the nation and the region in recent years and is expected to continue to increase at a record pace. Most of this growth is expected to occur in the suburbs, as the region's "baby boomers" (born between 1946 and 1964) age in place. The region's elderly population increased by 46 percent between 1970 and 2000, compared to an overall population increase of only five percent during the same decades. This disparity is even more dramatic when considering only the region's eight suburban counties (exclusive of Philadelphia), where the elderly population grew by 90 percent between 1970 and 2000, compared to an overall population increase of 22 percent.

Based on DVRPC forecasts, many of the region's counties can expect to experience a doubling or more of their elderly population by 2025. At this time, almost one in five of the region's residents will be over the age of 65. In Pennsylvania, Bucks and Chester counties will continue to see the most rapid maturation. Elderly residents are expected to account for over 21 percent of the population in each of these two counties by 2025, up from 12 percent in 2000. Philadelphia, home to 29 percent of the region's elderly residents in 2000, will see its share decline significantly by 2025. In New Jersey, Burlington County will see the most dramatic demographic shift, with the elderly population more than doubling between 2000 and 2025.

Many aging suburban baby boomers will want to stay in the suburban communities in which they have raised their families after they retire. Challenges facing seniors include a lack of affordable and accessible housing alternatives; limited accessibility within their existing homes; limited accessibility within their communities; and difficulties with transportation and mobility, especially given the lack of public transit in many suburban locations. Elderly homeowners will also face economic challenges, as the cost of essentials such as transportation and health care skyrocket, leaving less money available for housing costs (including rising property taxes and the costs of home repair and

Population Forecasts: 2005-2035

Jurisdiction	2005 Estimate	2015	2025	2035	Absolute Change	Percent Change
Bucks County	624,351	672,674	715,819	753,784	129,433	21%
Chester County	473,880	531,971	582,047	622,498	148,618	31%
Delaware County	555,206	556,979	558,563	559,956	4,750	1%
Montgomery County	780,544	822,952	860,816	894,136	113,592	15%
Philadelphia County	1,483,851	1,472,422	1,476,150	1,480,023	-3,828	0%
5 - PA counties	**3,917,832**	**4,056,998**	**4,193,395**	**4,310,397**	**392,565**	**10%**
Burlington County	446,866	482,153	513,569	541,203	94,337	21%
Camden County	515,027	518,632	521,851	524,684	9,657	2%
Gloucester County	274,229	309,751	341,468	369,374	95,145	35%
Mercer County	365,097	382,692	395,652	403,976	38,879	11%
4 - NJ counties	**1,601,219**	**1,693,228**	**1,772,540**	**1,839,237**	**238,018**	**15%**
9 - DVRPC counties	**5,519,051**	**5,750,226**	**5,965,935**	**6,149,634**	**630,583**	**11%**

Source: DVRPC 2007

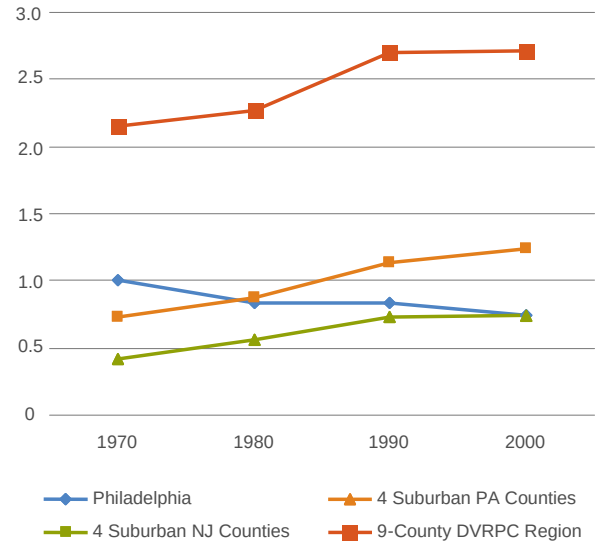
maintenance). It is imperative that the region's elected officials, planners, service providers, and the elderly and near-elderly themselves plan now to accommodate the coming "senior boom."

Employment

The region's employment grew significantly between 1980 and 1990, but the period since 1990 has been a period of shift rather than growth, as employment declined in the core cities and older suburbs and grew rapidly in the region's newer suburbs.

The most significant regional employment trend over the last few decades has been the shift from a manufacturing-based economy to a service-dominated economy, a trend seen throughout the nation as a whole, and particularly in most urban areas in the Northeast and Midwest. In 1969, manufacturing accounted for over 30 percent of the region's total employment; by 1985, that share had declined to under 20 percent, and by 2000, to under 12 percent. At the same time, the region's service-oriented employment grew significantly, particularly in the health, education, and professional services sectors.

Employment: 1970-2000 (millions)



Source: U.S. Census Bureau 1970-2000 as modified by DVRPC

Employment Forecasts: 2005-2035

Jurisdiction	2005 Estimate	2015	2025	2035	Absolute Change	Percent Change
Bucks County	277,886	301,910	323,361	342,236	64,350	23%
Chester County	253,628	285,352	313,815	337,093	83,465	33%
Delaware County	237,582	239,809	241,797	243,547	5,965	3%
Montgomery County	505,952	535,621	562,117	585,430	79,478	16%
Philadelphia County	728,054	724,962	731,831	736,268	8,214	1%
5 - PA counties	**2,003,102**	**2,087,654**	**2,172,921**	**2,244,574**	**241,472**	**12%**
Burlington County	214,621	231,760	247,063	260,529	45,908	21%
Camden County	222,721	224,200	225,520	226,682	3,961	2%
Gloucester County	108,229	122,291	134,847	145,895	37,666	35%
Mercer County	228,502	243,788	257,436	269,446	40,944	18%
4 - NJ counties	**774,073**	**822,039**	**864,866**	**902,552**	**128,479**	**17%**
9 - DVRPC counties	**2,777,175**	**2,909,693**	**3,037,787**	**3,147,126**	**369,951**	**13%**

Source: DVRPC 2007

Employment Forecasts

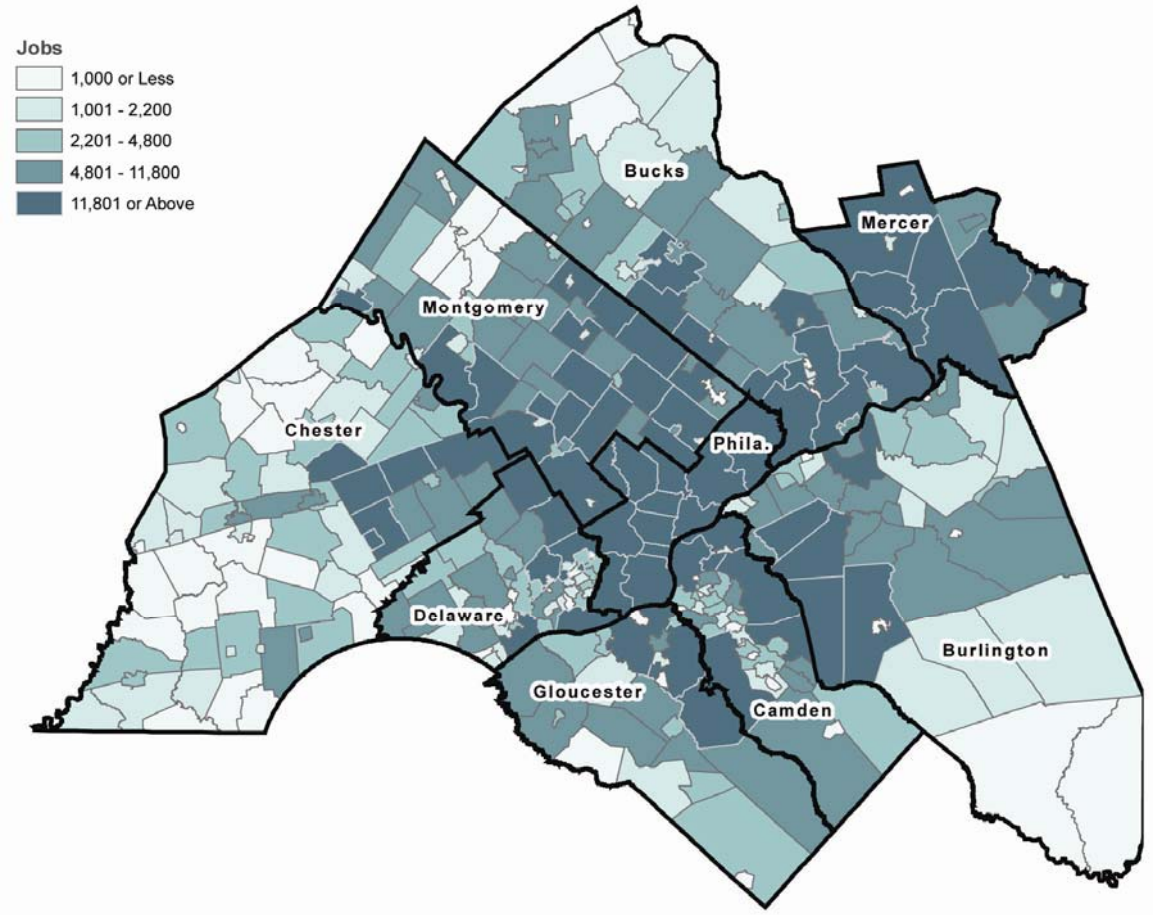
In general, employment is more difficult to forecast than population, since it is impacted by political and socioeconomic factors at local, regional, national, and global levels. Various studies and past experience, however, have shown that there is a direct relationship between the number of households in a region (which is a function of

population) and the number of jobs. The relative change in employment closely tracks the relative change in households, since the number of workers per household is relatively constant and because new households require goods and services, which creates jobs.

To forecast employment, DVRPC calculated the ratio of employment to population for each county and the region as a whole in 1990, 2000, and 2005, and, based on historic trends in these ratios, developed reasonable 2035 employment forecasts. Using planning knowledge of theoretical employment growth and decline, DVRPC developed a curve reflecting decreasing rates of growth or decline and applied these rates of change to forecast employment for the interim years. County and municipal forecasts in five-year increments through 2035 were then reviewed by each county planning department, which revised these forecasts as appropriate based on its knowledge of proposed development and local conditions. These forecasts were adopted by the DVRPC Board in July 2007.

Employment forecasts show a similar pattern of growth and distribution in the region as population, with the region's core cities, older boroughs, and first suburbs experiencing decline, and growth expected in municipalities located toward the edges of the region.

2035 Municipal Employment Forecast



Source: DVRPC, U.S. Census Bureau

Between 2005 and 2035, the region is forecast to add an additional 370,000 jobs, a 13 percent increase over 2005 levels. New Jersey is forecast to have a slightly higher percentage gain in employment compared to Pennsylvania, similar to the population forecasts. Employment in Gloucester County and Chester County is forecast to grow by the largest percentage over the life of the Plan, while Philadelphia, Delaware, and Camden counties will experience the lowest percentage growth.

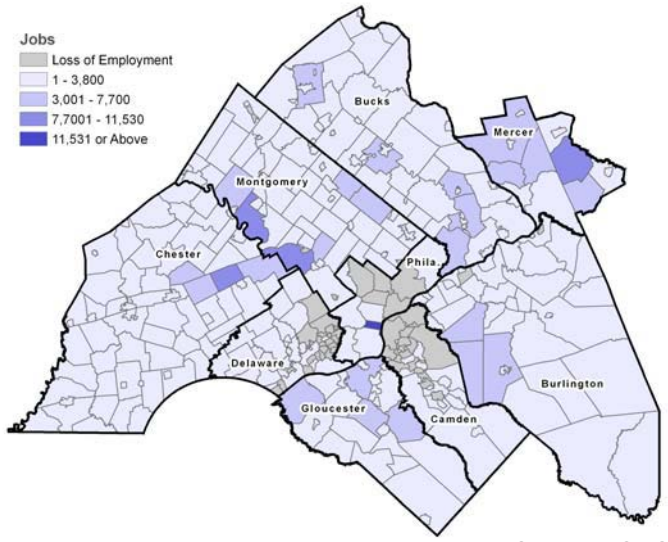
The City of Philadelphia will remain the region's largest job center, with over 736,000 jobs forecasted in 2035. Like population, however, the share of the region's employment located in the city is expected to decline from 26 percent in 2005 to 23 percent by 2035, due to continuing job growth in the region's suburbs. The largest absolute increase in employment is forecasted for Chester County, which is expected to gain over 83,000 new jobs. Other counties forecasted to gain a significant number of additional jobs include Montgomery County (forecast to gain over 79,000 jobs) and Bucks County (forecast to gain over 64,000 jobs).

Land Use

Land use information and analysis is a fundamental tool in the planning process. Since 1970, DVRPC has produced land use files for the nine-county region based on information derived from aerial photography. Originally updated every 10 years, DVRPC's land use data is now updated based on aerial surveillance gathered every five years.

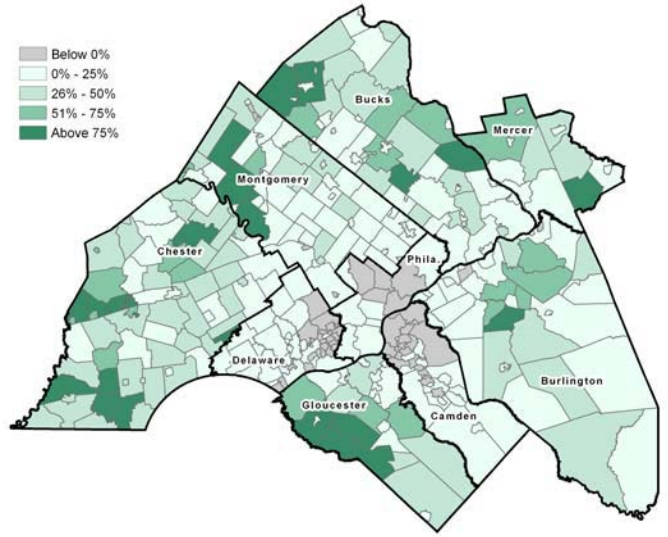
Where people live has changed dramatically over the course of the 20th century. In 1900, almost two-thirds of the region's population called Philadelphia home; by midcentury, that figure was a little over 50 percent. By the turn of the 20th century, just 28 percent of the region's residents lived in Philadelphia. As the region's population expanded, so did its settlement pattern, pushing out in ever-widening rings.

2035 Municipal Employment Forecast Absolute Change: 2005-2035



Source: DVRPC, U.S. Census Bureau

2035 Municipal Employment Forecast Percent Change: 2005-2035

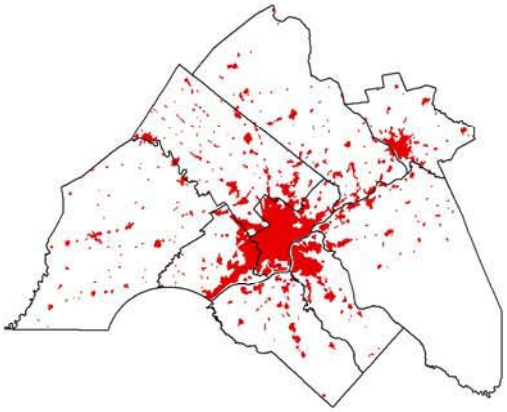


Source: DVRPC, U.S. Census Bureau

The three maps below illustrate the extent of regional development since 1930. In 1930, 3.3 million people lived in the nine counties and 222,000 acres in the region were developed. By 1970, the region's population had increased to 5.1 million people, while the land that was developed had nearly tripled to 641,000 acres. During these four decades, land developed at three and a half times the rate of population increase. This trend accelerated between 1970 and 2005 (when land consumption increased at seven times the rate of population increase), leading to continued suburban sprawl, with a consequent loss of open space and farmland coupled with decline in existing developed communities. By 2005, the region's population had increased to approximately 5.5 million people, while the developed area had increased to 960,000 acres. On a more positive note, the rate of development between 2000 and 2005 slowed, albeit slightly, compared to the rate between 1970 and 2000. From 1970 to 1990, development occurred at a rate of approximately one acre per hour; between 1990 and 2000, the rate accelerated to one acre every 45 minutes, but has since declined, with approximately one acre of land developed every 65 minutes between 2000 and 2005.

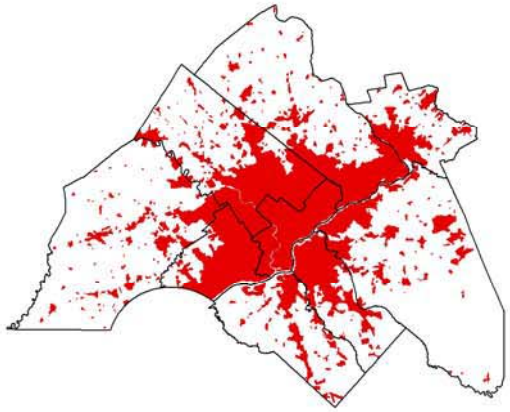
Extent of Regional Development

1930



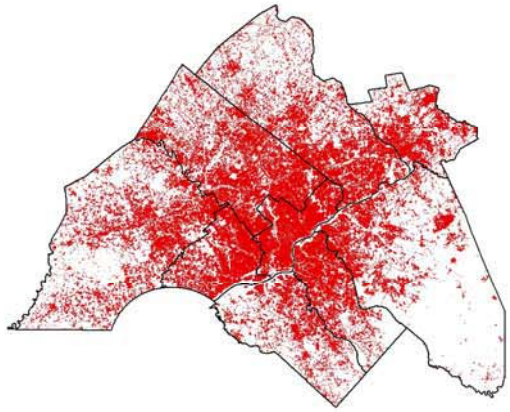
3.3 million people
222,000 acres developed
9% of region developed*

1970



5.1 million people
641,000 acres developed
26% of region developed*

2005



5.5 million people
960,000 acres developed
39% of region developed*

(*The total area of the region equals 2,439,899 acres)

Source: DVRPC 2009

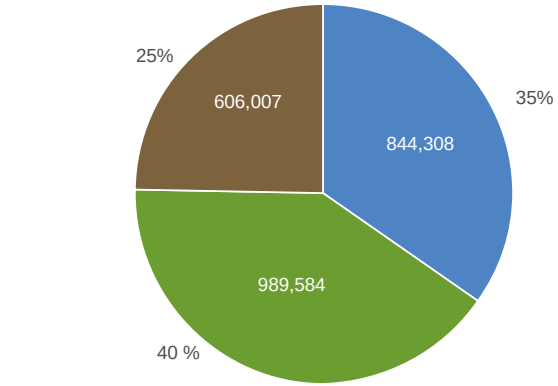
The charts on the right illustrate land use in 1995 and 2005. Of the region's total land area in 2005, 20 percent was in residential use (predominantly single family); 20 percent was in other developed uses; 21 percent was in agricultural use (down from 25 percent in 1995); and an additional 39 percent was either vacant or wooded, or water (also down slightly, from 40 percent in 1995). The region's population increased by four percent between 1995 and 2005, while residential land area increased by approximately 11 percent (a gain of over 48,000 acres). Other developed uses consumed an additional 67,000 acres, for a net increase of over 115,000 acres in developed land over the 10 years.

Between 1995 and 2005, just over one-quarter acre was developed with residential uses for every additional resident in the region. That number has declined slightly in more recent years: between 2000 and 2005, just over one-fifth of an acre was developed for every new resident.

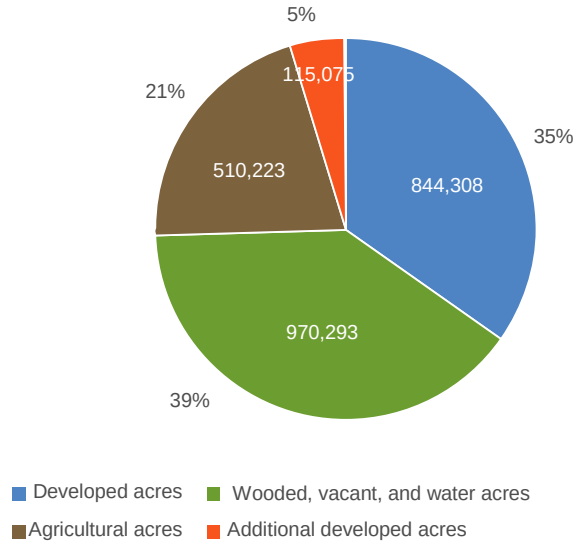
Chester and Bucks counties (in Pennsylvania) and Burlington and Gloucester counties (in New Jersey) realized the highest net increase in residential acres between 2000 and 2005. In terms of percentage increase, Chester and Gloucester counties each experienced a nine percent increase in residential acreage, followed by Burlington County at seven percent.

Between 2000 and 2005, the DVRPC region lost over 34,600 acres of agricultural land area and an additional 5,100 acres of other undeveloped areas, for a total loss of almost 40,000 undeveloped acres–an overall decline of over three percent in undeveloped land area since 2000. Chester, Montgomery, and Gloucester counties realized the greatest net loss of agricultural land during the five-year time span, while Burlington County saw the greatest decline in vacant or wooded acres.

1995 Land Use



2005 Land Use



Source: DVRPC 2008

The Environment

Environmental trends throughout Greater Philadelphia have largely been driven by changes in land use. The region's agricultural, wooded, and natural lands—areas collectively referred to as "open space"—have been continuously vanishing in recent decades, while the amount of developed land has steadily increased. Between 1970 and 2005, 320,000 acres of open space were lost to development. Furthermore, throughout this period, open space has been consumed primarily to accommodate lower-density development, not population growth.

Between 1990 and 2005, the region lost approximately 70,000 acres of wooded lands, or almost 5,000 acres per year. The ability of land to capture and store stormwater, filter pollutants, and ameliorate flooding is compromised by the loss of natural vegetation and woodlands. The impact of open space loss on the region's surface waters is borne out by surface water quality data. In 2006, 65 percent of the subwatersheds in DVRPC's four South Jersey counties did not meet statewide water quality standards for aquatic life use. In the five southeastern Pennsylvania counties, 34 percent of all assessed stream miles were impaired for aquatic life use in 2006. In 2008, that number grew to 36 percent.

Farmland in the region is some of the most productive agricultural land in the nation, but it is the type of land most likely to be converted to other developed uses. Greater Philadelphia lost 126,000 acres, or approximately 8,500 acres of farmland per year, between 1990 and 2005. This loss of agricultural land threatens the agricultural industry, diminishes the region's ability to produce food locally, and deprives communities of their cultural heritage and unique sense of place.

Although the region has been losing open space at a steady rate, land preservation activities have kept pace with the rate of development over the past 15 years—an average of 10,000 acres have been both developed and protected each year. In the 15 years prior to 2007, the region's publicly owned open space grew by almost 77,000 acres, a 31 percent increase, while the number of preserved farmland acres grew from 15,000 to 85,000, a 400 percent increase. As of 2007, nearly 477,000 acres within the region were permanently protected, including parkland, land-trust-owned and eased lands, and preserved farmland.

Protected public and private open space lands represent 14 percent and six percent of the region's total land area, respectively. Public protected lands increased by about 18,000 acres since DVRPC's 2004 inventory, though all but 2,000 acres of this increase occurred in Burlington County. Although public lands represent over 14 percent of the region's area, the analysis shows that these lands are not evenly distributed among the counties. Burlington County alone contains almost 53 percent of the region's public lands.

While Burlington County has by far the greatest amount of public land, both in terms of total area and acres per 1,000 residents, most of this area is for conservation purposes in the Pinelands, and is therefore less accessible to the majority of both the county and regional population.

The most dramatic and consistent gains in protected open space across the region since DVRPC's last inventory in 2004 occurred in farmland preservation. During this period, preserved farmland increased by almost 7,000 acres in Pennsylvania and nearly 11,000 acres in New Jersey.

Nonprofit protected open space increased by nearly 14,000 acres since 2004, although almost all of this gain occurred in Chester County and may partially reflect the use of a new data source for Chester County nonprofit lands.

Community gardens in Philadelphia and other urban areas are important to recognize and maintain. While not inventoried due to their small scale and uncertain ownership status, they provide visual relief, safe havens, community pride, and fresh, healthy produce for neighborhood residents.

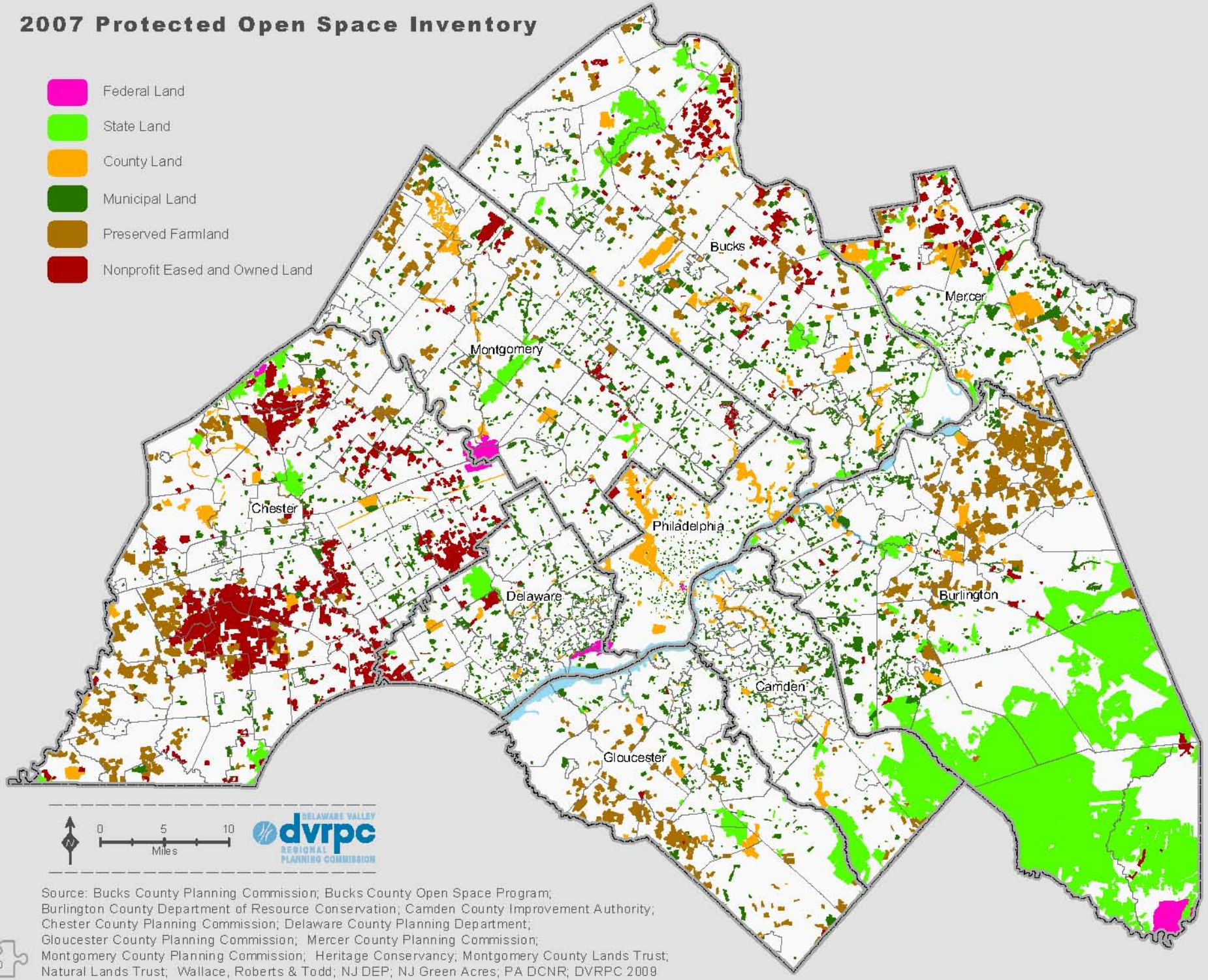
2007 Protected Open Space by Ownership

County	Publicly Owned Lands							Privately Owned Lands			
	Federal	State	County	Municipal	Total Protected Public Open Space	Protected Public Open Space as Percent of Total Area	Public Protected Acreage per 1,000 Residents	Preserved Farmland	Land Trust or Privately Protected	Total Protected Private Open Space	Protected Private Open Space as Percent of Total Area
Bucks	0	12,880	7,919	11,979	32,778	8.43%	54.8	9,982	8,046	18,028	4.64%
Chester	1,288	7,218	5,956	8,787	23,249	4.81%	53.6	24,875	44,506	69,381	14.34%
Delaware	729	2,584	1,659	4,630	9,602	8.15%	17.4	236	2,903	3,139	2.66%
Montgomery	1,964	3,774	4,899	9,129	19,766	6.39%	26.4	6,940	3,661	10,601	3.43%
Philadelphia	373	259	8,267	1,450	10,349	11.97%	6.8	0	488	488	0.56%
PA Total	**4,354**	**26,715**	**28,700**	**35,975**	**95,744**	**6.91%**	**24.9**	**42,033**	**59,604**	**101,637**	**7.33%**
Burlington	4,001	154,556	3,439	10,424	172,420	33.49%	407.2	25,841	1,739	27,580	5.36%
Camden	0	20,002	2,361	4,050	26,413	18.57%	51.9	1,313	0	1,313	0.92%
Gloucester	0	5,447	1,921	4,307	11,675	5.61%	45.8	10,232	302	10,534	5.06%
Mercer	0	4,208	8,614	8,875	21,697	15.01%	61.9	5,560	2,066	7,626	5.28%
NJ Total	**4,001**	**184,213**	**16,335**	**27,656**	**232,205**	**23.00%**	**151.0**	**42,946**	**4,107**	**47,053**	**4.66%**
Region Total	**8,355**	**210,928**	**45,035**	**63,631**	**327,949**	**13.69%**	**60.9**	**84,979**	**63,711**	**148,690**	**6.21%**

Source: Bucks County Planning Commission; Bucks County Open Space Program; Burlington County Department of Resource Conservation; Camden County Improvement Authority; Camden County Division of Open Space and Farmland Preservation; Chester County Planning Commission; Delaware County Planning Department; Gloucester County Planning Division; Mercer County Planning Commission; Montgomery County Planning Commission; Montgomery County Lands Trust; Natural Lands Trust; Wallace, Roberts & Todd; NJ DEP; NJDEP Green Acres Program; PA DCNR; DVRPC 2008

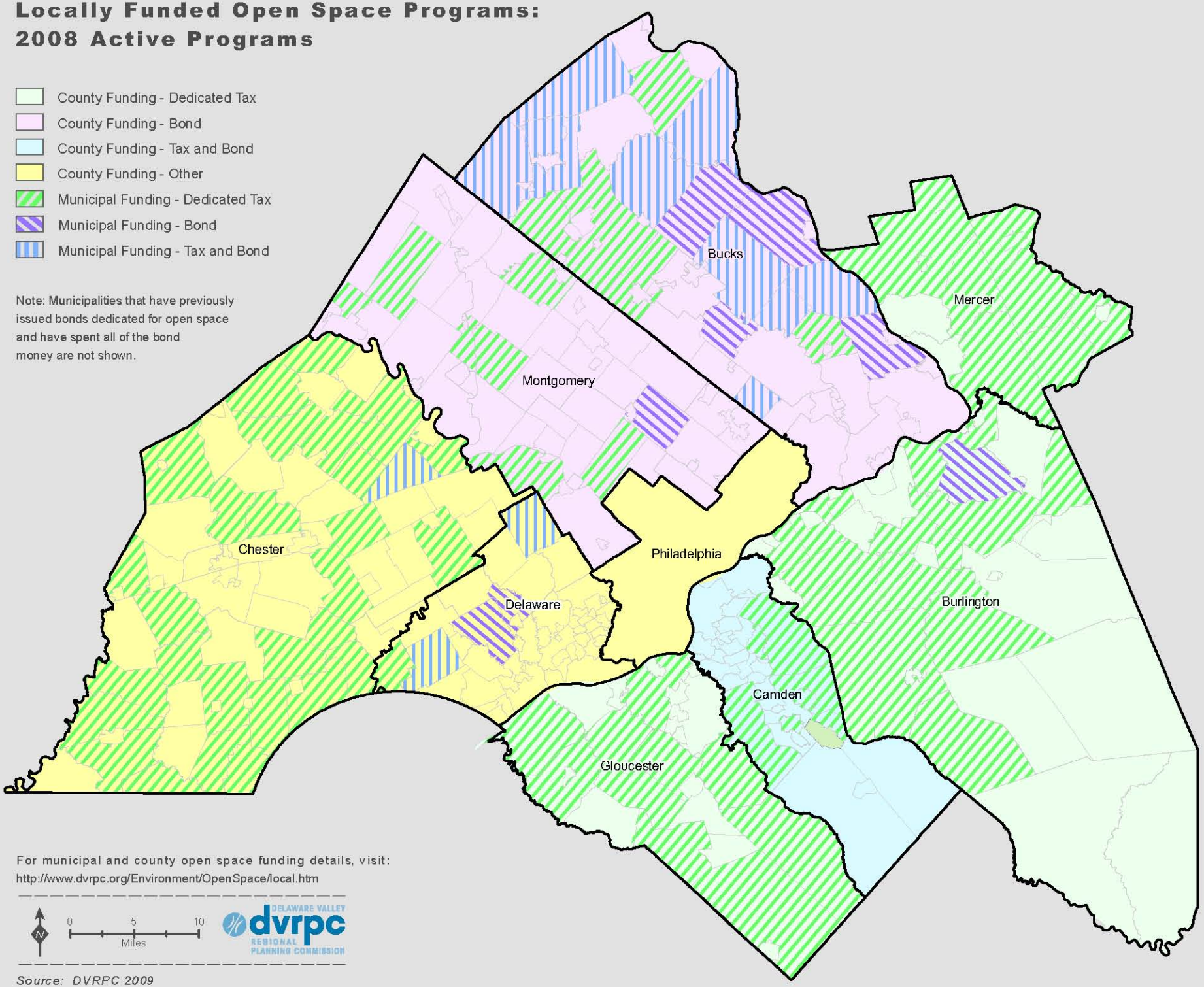
The importance of open space to the region is underscored by the growth of locally funded open space programs. Much of the region's success in preserving open space is the result of voter-approved county and municipal funding programs dedicated to open space preservation. The region is among the nation's leaders in the use of voter referendums to authorize conservation funding. Since 1987, county and municipal open space funding programs have generated over $1.5 billion dollars in local funding for conservation. In fact, according to the Trust for Public Land, the Greater Philadelphia region generates more dedicated funding per capita for conservation than any of the other 11 largest metropolitan areas in the country.

2007 Protected Open Space Inventory



Source: Bucks County Planning Commission; Bucks County Open Space Program; Burlington County Department of Resource Conservation; Camden County Improvement Authority; Chester County Planning Commission; Delaware County Planning Department; Gloucester County Planning Commission; Mercer County Planning Commission; Montgomery County Planning Commission; Heritage Conservancy; Montgomery County Lands Trust; Natural Lands Trust; Wallace, Roberts & Todd; NJ DEP; NJ Green Acres; PA DCNR; DVRPC 2009

Locally Funded Open Space Programs: 2008 Active Programs



Source: DVRPC 2009

In the DVRPC region, 240 local referendums have been held between 1988 and 2008. Voters approved 212 referendums (88 percent) authorizing counties and municipalities to levy additional taxes or issue bonds dedicated to open space preservation. Over this period, voters have approved over $738 million in bonds and $128 million in annual tax revenue and appropriations dedicated to open space preservation. Eighty-five percent of all open space referendums issued in New Jersey were approved. In Pennsylvania, 91 percent of all referendums were approved.

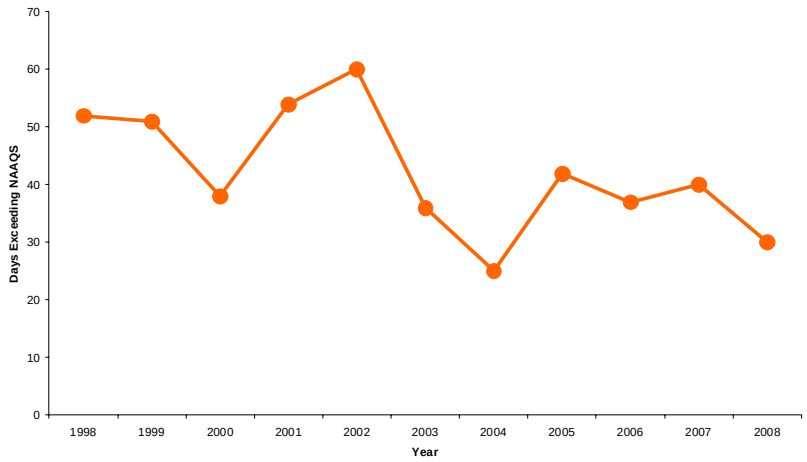
The number of local referendums issued for open space preservation increased dramatically in the past decade. Of the 240 referendums issued since 1988, 172 were issued in the past 10 years. All eight of the suburban counties and 123 of the region's 352 municipalities (35 percent) have submitted open space funding referendums to voters.

Air quality is another environmental issue that is a significant concern in the region. The Greater Philadelphia region does not meet the federal health-based standards for ground level ozone and fine particle pollution. The National Ambient Air Quality Standards (NAAQS) are measured at air quality monitors across the region and serve as a general indicator of the region's progress toward better air quality.

Ground level ozone is the primary air pollutant affecting the DVRPC region. Ozone is not directly emitted, but forms when nitrogen oxides combine with volatile organic compounds in the presence of sunlight, making ozone a summertime problem. Fine particle pollution, or $PM_{2.5}$, can reach unhealthy levels at anytime of the year, but high $PM_{2.5}$ levels often correspond with elevated levels of ozone.

Since climate plays a large role in the local accumulation and formation of these pollutants, days exceeding the NAAQS can show considerable variation from year to year due to weather conditions. It is also important to note that there were changes to the ozone standards in 2005 and again in 2008. This tightening of the standards results in a larger number of days that exceed the NAAQS than would be indicated if the standards had not changed. The overall number of days that exceed the federal health-based air quality standard has dropped over the past 10 years. However, air pollution levels in the region remain above the national standard.

Number of Days Exceeding the NAAQS



Note: Data is for the Metropolitan Statistical Area (MSA), which does not include Mercer County, NJ. Salem County, NJ is included in the MSA data; Data is for PM and Ozone; Years are normalized to current standards, so violations are higher in years prior to the implementation of the new, tighter standard than they were in previous reports. Because standards have been lowered, violations in those prior years have increased.

Source: U.S. Environmental Protection Agency 1998-2008

Economic Competitiveness

The region's future economic competitiveness will depend on a number of factors, including its ability to continue to attract and retain a qualified work force. The percentage of the region's adult population with associate's degrees, bachelor's degrees, and graduate or professional degrees has increased steadily since 1990. As of 2005, over 32 percent of the region's adults over the age of 25 had completed at least four years of college, ranking sixth among the nation's largest metropolitan areas. While the percentages of high school and college graduates have improved during the last decade and meet or exceed the national average, the greatest challenges remain in the core cities of Philadelphia, Trenton, Camden, and Chester, where SAT scores and high school and college graduation rates are significantly lower than state or regional averages. In Philadelphia in 2000, for example, almost 29 percent of adults had not completed high school, compared to less than 13 percent in the suburbs. Only 18 percent of adults living in Philadelphia had obtained a college degree, compared to 33 percent in the suburban counties.

The region's educational resources are impressive. According to *Cities Ranked and Rated*, the Philadelphia and Trenton metropolitan areas combined have 46 four-year colleges and universities, third only to New York City and Chicago. In 2006, Select Greater Philadelphia, a regional marketing organization, identified 89 educational institutions within the nine-county DVRPC region that offer at least a two-year associate's degree. When compared to the top 25 metropolitan statistical areas (MSAs), the Greater Philadelphia region ranks second only to Boston in the number of bachelor's and first professional degrees awarded per capita. According to US News and World Report rankings, the region is home to two of the nation's best universities: Princeton University in Mercer County, New Jersey, and the University of Pennsylvania in Philadelphia.

2007 Labor Force Characteristics

Employment Status	Number	Percent
Population 16 years and over	**4,338,880**	**100%**
In labor force	**2,832,756**	**65%**
Civilian labor force	2,825,432	99.7%
Employed	*2,637,558*	*93%*
Unemployed	*187,874*	*7%*
Armed Forces	7,324	0.3%
Not in labor force	**1,506,124**	**35%**
Occupations	Number	Percent
Civilian employed population 16 years and over	**2,637,558**	**100%**
Management and professional	1,044,991	40%
Service	410,943	16%
Sales and office occupations	719,708	27%
Farming, fishing, and forestry occupations	7,050	0.3%
Construction, extraction, maintenance, and repair	194,447	7%
Production, transportation, and material moving	260,419	10%

Source: U.S. Census Bureau, American Community Survey, 2007

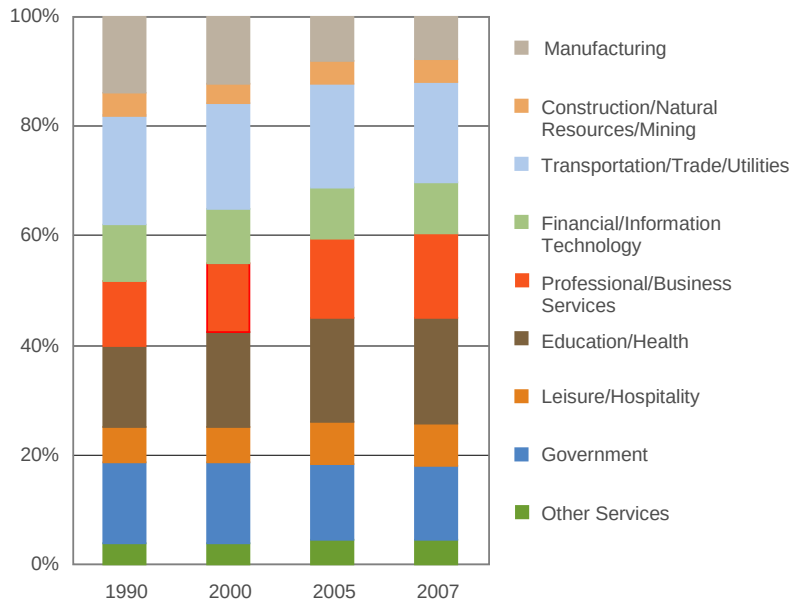
In 2007, 65 percent of the region's population over the age of 16 was in the civilian labor force, with 93.4 percent of those employed and 6.6 percent unemployed. Largely because of its economic diversity, unemployment in the Greater Philadelphia region has historically been lower than that of the nation and other large metropolitan areas with less diverse economies. A diverse economy, while not "booming," is resilient, protected from potential extremes in job growth or decline related to a specific industry.

Of those people working in the civilian labor force, 40 percent were employed in management, professional, or related occupations (compared to 34 percent nationwide); 27 percent in sales and office occupations; 16 percent in other service occupations; and the remaining 17 percent in construction or production-related occupations.

Based on the 2007 American Community Survey, the region's estimated average annual household income of $79,697 was almost 20 percent higher than the nation's, while the per-capita income was almost $31,000 compared to a national average of just over $26,000. The Greater Philadelphia region boasts the fifth-highest per-capita income and a lower overall cost of living than other large metropolitan areas. According to the National Association of Realtors, in 2008 those looking to locate in Greater Philadelphia found the seventh-lowest median price for an existing single-family home ($251,700) amongst the nation's 12 largest metropolitan areas. The region's residents enjoy a high quality of life, with excellent museums, music, multicultural festivals, recreational venues, and important historical sites. The region's diverse neighborhood options range from urban living to growing suburbs to rural towns and villages.

The figure to the right illustrates regional nonfarm employment by major sector in 1990, 2000, 2005, and 2007. Since 1995, the number of manufacturing jobs has declined by 38 percent, while the number of nonmanufacturing jobs, particularly service sector employment, has increased by 20 percent. Fast-growing service sectors include professional and business services; leisure and hospitality; and education and health-related services.

Nonfarm Employment Sectors



Source: U.S. Bureau of Labor Statistics 1990-2007

The region's economy has transitioned from industrial manufacturing to professional services, with almost 75 percent of the region's workforce currently employed in service-providing sectors, following an increase of over 390,000 service-providing jobs between 1990 and 2007. Knowledge-based industries now also play a prominent role, with life sciences, information technology, professional services, and chemicals ranking among the region's top industries. Sectors such as education and health services, professional and business services, financial activities, and information

technology require highly educated and skilled workers, and now make up over 44 percent of the region's employment.

Greater Philadelphia's thriving life sciences cluster of pharmaceutical, biotech, research and development, and support companies is one of the largest in the nation. With deep roots in public health, the region has become one of the nation's top life science industry centers. Greater Philadelphia is also powered by a solid and diversified information technology (IT) industry, which ranks as the sixth-largest in the country, based on shares of employment in IT occupations and IT-providing industries in the nation's 12 largest metropolitan statistical areas. IT plays a major role in the local economy, both as a provider of IT products and services and as a support function to other major industries.

With a strong base of highly skilled workers, top universities, and support infrastructure for a wide variety of high-tech industries, Greater Philadelphia has transformed from a traditional manufacturing center to a high-tech manufacturing hub. Although the manufacturing sector has declined in recent decades, it remains an important part of the region's economy. Next-generation electronics, defense systems, aerospace, and shipbuilding are just a few of the diverse, highly specialized manufacturing segments thriving in the region. There is also one of the largest concentrations of the chemical manufacturing industry in the country, traditionally a major driver of the region's economy.

Already a national leader with more than 100 companies engaged in nanotechnology business activities, the region ranks second nationally in nanotechnology-related patents and research. We have also become a hub for alternative energy, with the world's three largest wind energy companies, Gamesa, Iberdrola, and GE Wind, as well as the world's largest solar energy systems integrator, SunTechnics (a subsidiary of Conergy), all with a presence in the area.

Greater Philadelphia currently boasts a large and diverse set of eco-enterprises, comprised of businesses and professionals that possess the potential to transform challenges in energy efficiency and ecological sustainability into a competitive economic advantage, creating jobs and quality economic development. In 2005, the region ranked seventh nationally in terms of eco-enterprise professionals as a percent of total employment, comparing favorably on a per-capita employment basis to our competitor regions. Eco-enterprises can offer new economic life and purpose to the infrastructure and facilities of the region's once vast production economy, providing economic growth and new employment born out of the economic restructuring of previous decades. The ecologically sustainable manufacture and harvest of products and commodities such as food and energy address the increasingly expensive externalities of current production patterns within and outside of the region.

To some, eco-enterprises are the vanguard of a new global economy that will emerge to meet the requirements of an era in which resource extraction and energy consumption are increasingly expensive. The restructuring of economies in response to resource depletion presents huge opportunities, as shifts in production create jobs and open new areas of economic growth.

Energy dependence and increasing commodity prices threaten our economic stability. As one of the nation's largest post-industrial regions, we must address the vestiges of our former manufacturing-based economy, which are now economic and ecological liabilities. Growth of the nation's service industries and its feverish production of technological innovation have buoyed the continued growth of the regional economy. Eco-enterprise businesses and professionals lie on the next horizon of economic expansion and continued prosperity as we begin to grapple with the adverse impacts of an increasingly global economy.

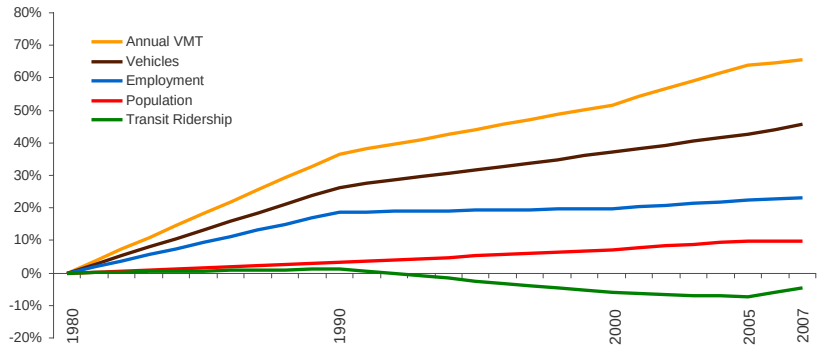
Transportation

The evolving decentralized land use pattern coupled with new technologies has had significant impact on the way that people in the region have traveled over the past century. Travel at the beginning of the 20th century was limited by how far people could travel using mass transit or walking. The passenger rail infrastructure that developed during this time primarily served Center City Philadelphia and was designed as a radial or hub-and-spoke system that brought commuters from residential "bedroom" suburbs into work in Philadelphia. During the post-World War II period, the private automobile dominated and increased the distance people could travel between home and work. During the latter part of the 20th century–as population pushed farther outward and the number of different employment centers sprouted throughout the region–the number of different origins and destinations multiplied. This had a dramatic impact on transit ridership, which requires a large, centralized population and high employment densities in specific centers. Between 1980 and 2000, the number of automobiles in the region increased by 37 percent and the number of vehicle miles traveled (VMT) increased by 52 percent, despite a population increase of only seven percent. As the region spread out, transit and walking became less feasible as trip lengths became longer and required the use of an automobile to complete.

More recently, however, the region has seen a slight shift in travel patterns. Vehicle miles traveled remained relatively flat between 2005 and 2007, and due first to high oil prices and then the global recession, these numbers are not likely to grow in the near future. Meanwhile, transit ridership, which fell steadily from 1990 to 2005, has risen from 2005 to 2007. This mirrors national trends, where 2008 recorded the highest level of transit ridership since the early 1950s.

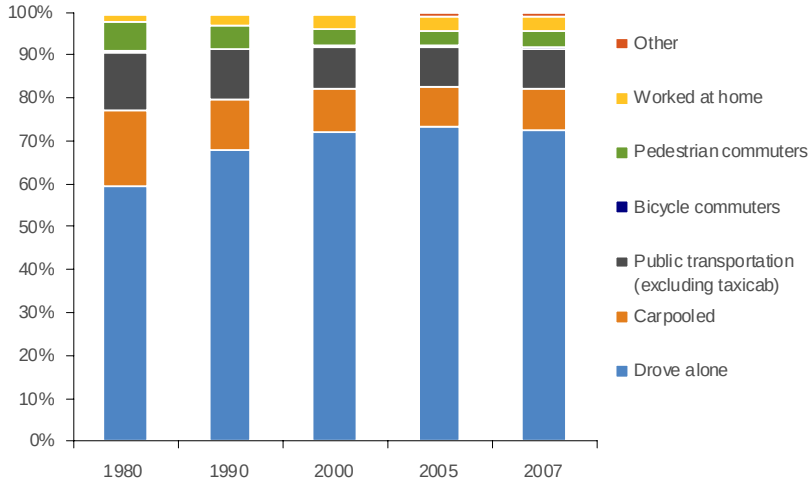
Commuting patterns have also seen longer-term trends beginning to taper. After rapid increases in the number of commuters driving alone from 1980 to

Change in Population, Employment, Vehicles, VMT, and Transit Ridership: 1980-2007



Source: U.S. Census Bureau 1980-2000; American Community Survey 2005-2007; PennDOT, NJDOT, SEPTA, DRPA/PATCO, NJ Transit 1980-2007

Commuting Modes: 1980-2007



Source: U.S. Census Bureau 1980-2000, American Community Survey 2005-2007

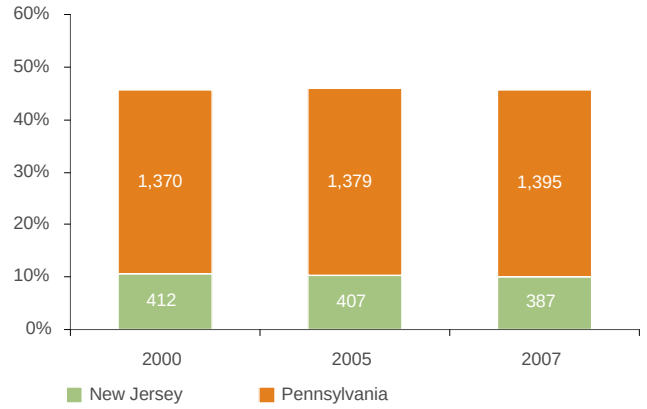
2000, this form of commuting has remained steady. During the 1980s and 1990s, the commuting pattern became increasingly suburb to suburb, with a declining percent of the region's jobs located in regional centers. Matching this change in pattern, the region saw significant declines in walking, transit ridership, and carpooling during these times. Since 2000, most forms of commuting have remained at relatively similar levels, with some growth in the number of people bicycling and working at home.

Regional vehicle hours of delay, as defined by the Texas Transportation Institute, increased by 163 percent from 1982 to 2000. This was during the period of rapid regional decentralization and heavy growth in VMT. Congestion began to occur over longer stretches of each day and delayed more people, goods, and services, negatively impacting the region's economy. Since 2000, vehicle hours of delay actually decreased from 42 annually per peak-hour traveler to 38 in 2007. While this is an improvement, congestion is still well above 1982 levels and remains a major issue in the region. Several regional surveys, including DVRPC's 2005 *Destination 2030* household survey and 2008 *Connections* online survey, found congestion to be one of the top issues negatively affecting the quality of life and business activity in the region.

The DVRPC region has increasingly been focusing on a "fix-it-first" approach with respect to transportation infrastructure. Despite these efforts, the region has been unable to gain ground on bridges that are functionally obsolete or structurally deficient. Between 2000 and 2007, the number of deficient bridges in the region remained steady, at about 45 percent. Due to the aging bridge infrastructure in the region, bridges have been falling into disrepair as fast as they are being reconstructed.

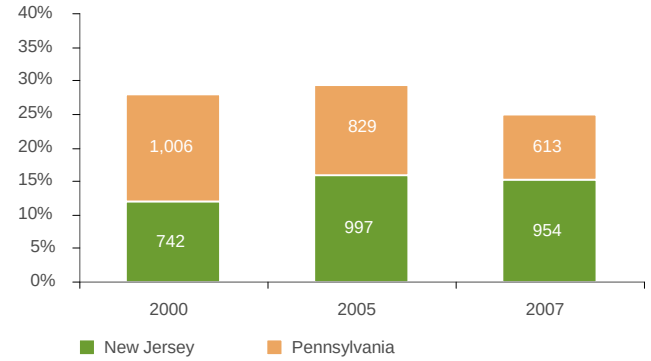
In contrast, the region has been able to make progress on pavement condition. From 2005 to 2007, the number of lane miles rated as deficient in the region has decreased by 259 miles, or 4.2 percent of the total.

Percent and Number of Deficient Bridges



Source: NJDOT and PennDOT 2008

Percent and Number of Deficient Lane Miles

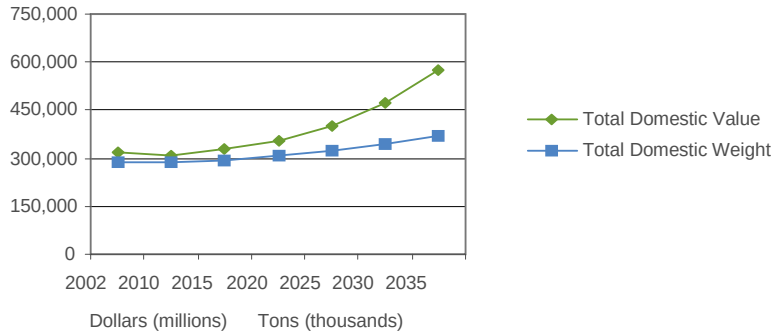


Source: NJDOT and PennDOT 2008

The movement of freight is an important aspect of the transportation system and is of increasing concern to the region. Both the weight and value of shipments in the region are predicted to increase in the next 25 years. The forecasts include intraregional, domestic outbound, and domestic inbound shipments, but not international shipments. According to the forecasts, the

weight of goods will grow 29 percent, from 286 million tons to 369 million tons, and the value of goods shipped will grow 82 percent, from $317 billion in 2002 to $577 billion in 2035 (in 2002 dollars).

Total Domestic Shipments



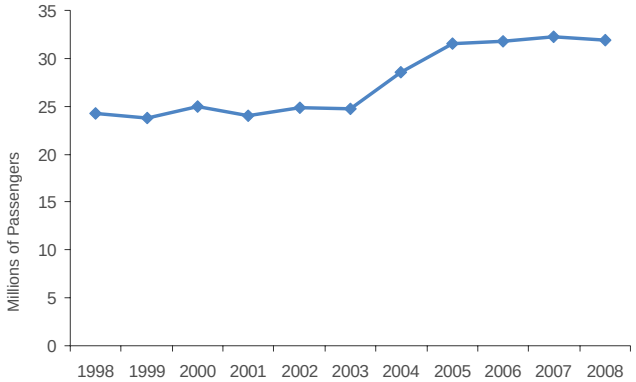
Source: Freight Flows and Forecasts for the Philadelphia Consolidated Statistical Area, DVRPC 2009

Investment in an overburdened transportation system, particularly National Highway System (NHS) Connectors, is imperative to handle the increase in freight traffic. NHS Connectors provide the critical link between the region's freeways and major airport, port, and other freight facilities.

Philadelphia International Airport (PHL) has seen a 1.2 percent decline of total passenger traffic directly due to the economic crisis and a decline in total plane movements of 1.5 percent between the end of 2007 and the end of 2008.[2] Despite these short-term loses, the PHL Master Plan Update forecasts passenger enplanements to increase from 13.55 million in 2005 to 26.1 million in 2025, a 93 percent increase.[3] This document also anticipates that aircraft operations will increase from 508,000 in 2005 to 760,000 in 2025, a 50 percent increase.[4] General Aviation (GA) nontowered (airports without an operating tower or air traffic control unit) aircraft traffic is monitored by DVRPC in this region. For all regional nontowered airports included in our Regional Airport System Plan, a decline of 2.4 percent has been registered within the last completed counting cycle between 1999 and 2005.[5] A continued decline in the short term is expected before a flat growth is forecasted midterm. A slight increase in total GA operations, concurrent with the Federal Aviation Administration, forecast at 0.6 percent annually, mainly consisting of GA aircraft used for business trips, is forecasted regionally. GA recreational trips are forecast to continue to decline in the midterm.

With an emphasis on reduced energy use and greenhouse gas production, a global and regional shift to sustainable development will necessitate a reduction in long-distance travel of people and goods. The *Connections* Plan straddles the line between planning for existing trends and recognizing forces that are likely to shape the future. Where forces of change are likely to result in negative impacts, the Plan attempts to lessen them.

Total Passenger Traffic at Philadelphia International Airport



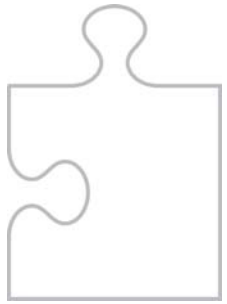
Source: Philadelphia International Airport 2009

[2] Philadelphia International Airport website. About PHL. Activity Reports. City of Philadelphia. 2009. www.phl.org.
[3] Philadelphia International Airport, Master Plan Update, Final Technical Report 2004.01, Forecast of Aviation Demand - Update, DMJM Aviation, 23 February 2004; amended November 2004.
[4] Ibid.

[5] DVRPC Aircraft Operations Counting Program, Reports 2001/2002, 2002/2003 and 2004/2005.

CHAPTER 3

Creating a Vision for the Future



The long-range planning process requires a vision of the future to be defined in order to develop a set of goals and strategies to achieve the vision. The vision is based on looking at recent and historic trends, as well as future forecasts, and collectively discussing which trends and forecasts we would like to bolster and which we would like to alter. A key component of reprioritizing issues is the Tracking Progress effort.

Tracking Progress

Tracking Progress is an ongoing, outcome-based effort to align DVRPC's planning and implementation activities and is intended to guide the region's investment strategy and help to achieve the Long-Range Plan's adopted visions and goals. The project is designed to collect and compile a meaningful time series data set that can help DVRPC and its planning partners to be more effective and proactive in decision-making. The resulting products also feed back into future long-range plan updates and subsequent performance measures to provide an invaluable interface between the region's investment pattern and the evaluative process. The regional indicators that were tracked as part of *Tracking Progress Toward 2030: Regional Indicators for the DVRPC Long-Range Plan* indicated that the region was not faring well in several key areas, including: curbing sprawl, redirecting new growth to the region's established centers, and addressing the large number of deficient bridges and road miles within the region.

Regional What-if Scenarios

For the *Connections* Plan, DVRPC conducted a scenario planning exercise to present a set of alternative futures to spur discussion on a vision for the region. An extensive public outreach process broadened the dialogue to include as many varying views and ideas as possible. DVRPC's scenario planning exercise compared the magnitude of impacts for two extreme settlement patterns–a **Recentralization** of population and jobs back into the region's developed areas, and an acceleration of **Sprawl** into the region's undeveloped outlying areas. A third, **Trend**, scenario based on the DVRPC Board-adopted population and employment forecasts for 2035 serves as a benchmark to the two extreme scenarios. The scenario analysis is intended to help better understand how different development patterns could affect land use, transportation, the environment, and economic competitiveness. It also highlights some of the trade-offs between the scenarios.

All three scenarios forecast a total regional population of 6.15 million and employment of 3.15 million in 2035. The difference is where individuals will live and work. The Recentralization scenario locates most population and employment growth in the region's core cities and developed communities,

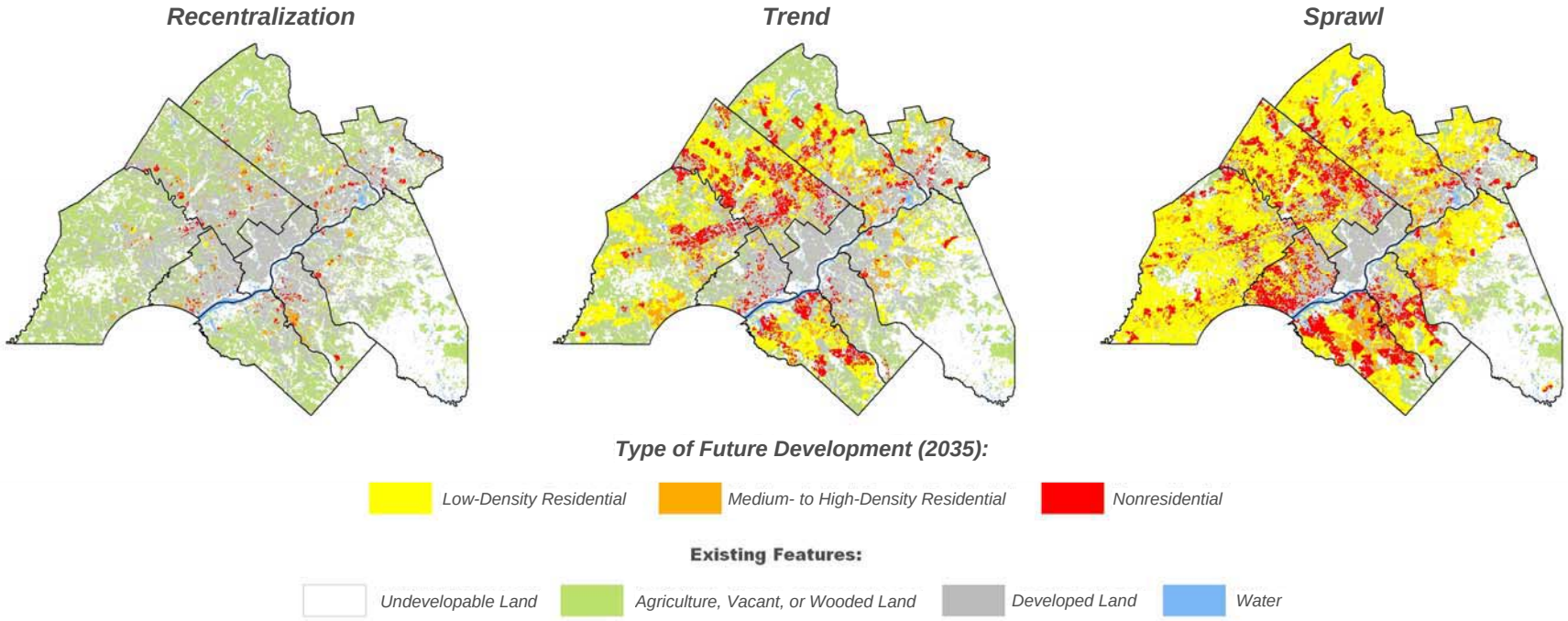
with more reuse and densification of already developed areas. The Trend scenario foresees some of the region's residents and jobs moving away from existing developed communities and relocating—along with future population and employment growth—in growing suburbs and rural areas. Development will mostly occur in currently undeveloped areas, with some infill site reuse. The Sprawl scenario greatly accelerates this trend, with population and job losses in the developed areas and more gains in outlying suburbs and rural areas that are currently designated as open space.

The what-if scenario exercise analyzed the impact of each of the scenarios on various factors organized around the four Long-Range Plan themes of land use, the environment, economic competitiveness, and transportation.

Land Use

By accommodating increases in population and employment through compact infill development, the Recentralization scenario saves existing open space. This scenario could preserve 163,000 acres compared to the current trend, an area roughly the size of Camden County. Of these acres, 71,800 are currently used for agriculture and 37,600 are forested. By preserving more land for agricultural use, the region is better able to respond to changes in global trading, specifically those related to shifts in food and energy prices. This allows for more locally grown food, providing economic and nutritional benefits for the region's residents.

New Footprint Development by Scenario: 2005-2035



Under the Sprawl scenario, an additional 309,000 acres would be developed in the region compared to the current trend, an area roughly the size of Montgomery County. This would result in the loss of 168,000 agricultural acres in the region and 137,000 wooded acres.

The wetlands and forests that remain intact in the Recentralization scenario will continue to filter out pollutants, mitigate flooding, and reduce erosion and stormwater runoff. The Sprawl scenario, on the other hand, would develop a considerable portion of the region's existing open space, creating more pollution, while at the same time reducing the ability of the ecosystem to mitigate the negative impacts of pollutants.

New Footprint Acres Developed by Scenario: 2005-2035

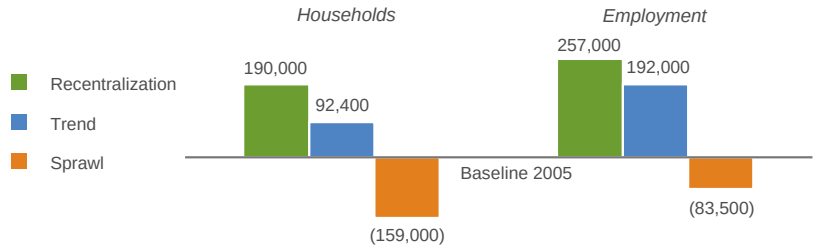
Acres	Recentralization	Trend	Sprawl
Agricultural	2,740	74,500	242,000
Wooded	1,970	39,600	167,000
Other Vacant	1,090	54,900	69,000
Total	5,800	169,000	478,000
Regional Average Residential Lot Size (in Acres)	0.28	0.34	0.45

Source: DVRPC 2008

In addition to consuming what is currently open space, the Sprawl scenario locates many new jobs and housing units in areas of the region that lack transit access. This scenario anticipates that the current number of jobs and housing units with transit access will decrease by 159,000 and 83,500, respectively, in 2035. The diffuse nature of the Sprawl scenario makes it difficult to create new transit service in an economically feasible way.

The Recentralization scenario could add more than 190,000 new households and 257,000 new jobs in areas with existing transit access. Increasing the number of jobs and households with transit access encourages transit ridership, reducing automobile driving and air pollution.

Change in Transit Access by Scenario: 2005-2035



Source: DVRPC 2009

The Environment

Increased use of alternative modes of transportation and fewer vehicle miles traveled can reduce vehicle-based emissions. By 2035, the Recentralization scenario could lead to an annual reduction of 20 tons of fine particulate matter ($PM_{2.5}$), more than 400 tons of volatile organic compounds (VOCs), and 260 tons of oxides of nitrogen (NOx) compared to the current trend; and by 40 tons of $PM_{2.5}$, 700 tons of VOCs, and 400 tons of NOx released into the atmosphere compared to the Sprawl scenario. VOCs and NOx form ground-level ozone, and more emissions will worsen the region's air quality. This negatively affects the health of individuals who suffer from asthma, bronchitis, heart disease, and other respiratory illnesses, and damages crops and lowers water quality.

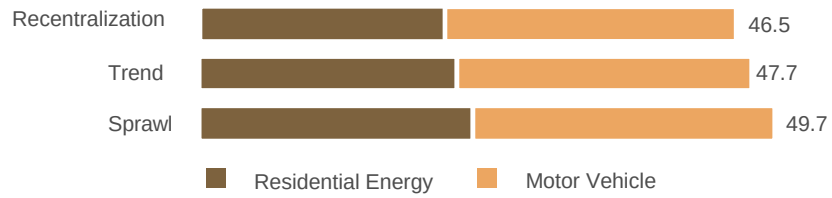
2035 Difference in Daily Vehicle Emissions by Scenario

Indicator	Recentralization	Trend	Sprawl
NOx (tons per year)	7,700	7,960	8,100
VOC (ton per year)	10,800	11,210	11,500
$PM_{2.5}$ (tons per year)	640	660	680

Source: DVRPC 2008

The average household in the Recentralization scenario will require 0.4 percent less energy to power, heat, and cool than an average household under the current trend. Conversely, the average household in the Sprawl scenario will need 2.9 percent more energy per household than in the Trend. Motor vehicle fuel use is 3.4 percent lower in the Recentralization scenario than in the Trend. In the Sprawl scenario, vehicle fuel use is 2.6 percent higher than in the Trend. By using less energy to power, heat, and cool residences and for driving in the Recentralization scenario, carbon dioxide (CO_2) emissions from residential and vehicle energy use could be decreased by nearly 1.2 million tons in 2035, or by about 15 million tons over the life of the *Connections* Plan, compared to the Trend. This would produce the same benefits as planting more than 28 million trees in the region. The Sprawl scenario will likely emit 2 million additional tons of CO_2 from transportation and residential energy consumption in 2035, and about 25 million tons of CO_2 emissions over the life of the *Connections* Plan, compared to the Trend. This would require planting more than 47 million trees in the region to offset just these additional emissions.

2035 Residential Energy and Motor Vehicle Greenhouse Gas Emissions ($MMTCO_2E$) by Scenario



Source: DVRPC 2008

Global climate change threatens ecosystems around the planet, and our economy continues to be highly dependent on an uncertain future supply of petroleum. Solutions to both of these issues are related to reducing energy demand and finding less carbon-intense alternative fuels. While no single solution will be capable of meeting the challenges of these twin crises, a series of partial solutions implemented together can achieve sustainability. The Recentralization scenario, by reducing energy demand and CO_2 emissions, can be a key part of this solution.

Economic Competitiveness

Utilizing and maintaining existing infrastructure rather than duplicating it with new facilities could provide major economic benefits to the region. Energy consumption can be reduced by more efficient land use, such as higher density and mixed uses. This can make the region more energy independent and better prepared for energy price volatility, while lowering greenhouse gas emissions. By returning population and jobs to older areas that have declined, municipal fiscal health can also be improved. All of these factors reduce costs for businesses and residents, which enhances the region's economic competitiveness in the global marketplace.

DVRPC estimates that by using less energy to power households and automobiles, along with lower rates of auto ownership, the Recentralization scenario could save the average household $310 in annual auto and utility expenses compared to the Trend, and more than $1,300 compared to the Sprawl scenario.

2035 Average Household Auto and Utility Expenditures by Scenario

Source: DVRPC 2008

The estimated total supporting infrastructure costs for schools, local roads, sewers, and water is $25 billion more under the Sprawl scenario than the

Trend. The Sprawl scenario projects more than twice as many new housing units and $15,900 higher per-unit costs. More greenfield development translates to additional lane miles of road, sewer and water line extensions, and new schools, all of which duplicate infrastructure already built in the region's developed communities and core cities. By more fully utilizing existing infrastructure, the Recentralization scenario could save a total of nearly $3 billion, $8,800 per new housing unit, compared to the Trend, and $24,800 per new housing unit compared to the Sprawl, even after taking maintenance and limited expansion of existing infrastructure into account.

Supporting Infrastructure Costs (In Billions) by Scenario: 2005-2035

Infrastructure	Recentralization	Trend	Sprawl
Sewer and Water	$1.4 B	$2.2 B	$6.3 B
Roads	$3.4 B	$5.8 B	$23.1 B
Schools	$2.7 B	$2.8 B	$6.3 B
Total Cost	$7.4 B	$10.8 B	$35.6 B
Per New Household	$28,700	$37,500	$53,500

Source: DVRPC 2008

Transportation

The Recentralization scenario locates more households and jobs in areas that are already served by transit. As a result, this scenario could increase transit ridership by 14 percent in 2035, compared to the Trend. The Sprawl scenario shows fewer households and jobs located near transit, resulting in 30 percent fewer transit trips compared to the Trend scenario. Transit is a more sustainable form of transportation, as it uses considerably less energy and produces lower greenhouse gas emissions per passenger mile than automobiles.

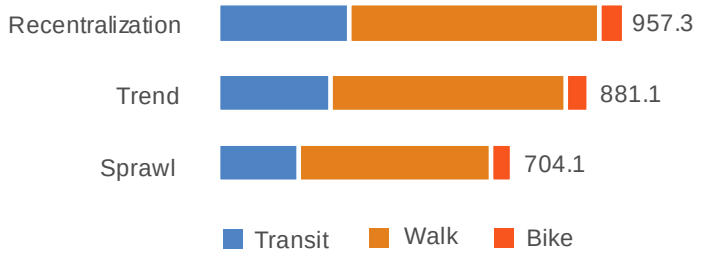
2035 Transportation Indicators by Scenario

Indicator	Recentralization	Trend	Sprawl
Annual Vehicle Miles Traveled (billions of VMT)	47.0	48.7	50.0
Annual Vehicle Trips (billions)	7.60	7.80	8.29
Annual Crashes	62,400	64,600	66,600
Average Peak-Period Roadway Speed (MPH)	30.2	29.7	28.6
Annual Transit Trips (millions of linked trips)	310.2	272.5	190.2
Annual Wasted Time (Millions of Person Hours of Delay)	146.3	170.3	202.3
Annual Hours of Delay per Capita	23.8	27.7	32.9
Annual Pedestrian Trips (millions)	590.4	554.3	465.0
Annual Bicycle Trips (millions)	56.8	54.3	48.9

Source: DVRPC 2008

The more compact nature and mixed-use development pattern of the Recentralization scenario can also encourage more walking and biking trips. This scenario is estimated to increase pedestrian trips by 6.5 percent and bicycle trips by 4.6 percent in 2035 compared to the Trend. The Sprawl scenario anticipates 16.1 percent fewer walking and 9.9 percent less bicycling trips than the Trend in 2035.

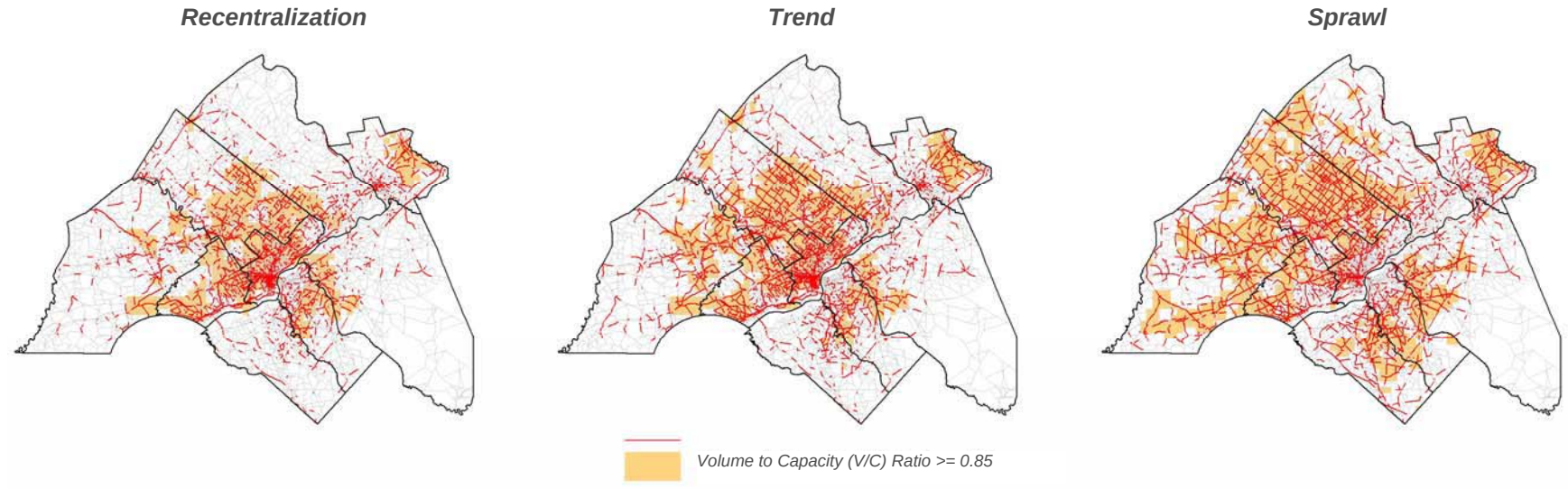
2035 Alternative Transportation Trips (Millions of Trips) by Scenario



Source: DVRPC 2008

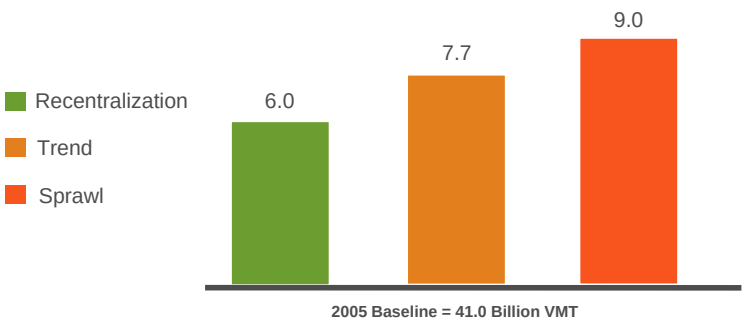
Population and employment is highly decentralized in the Sprawl scenario, increasing the region's auto dependency. This scenario projects an additional 1.3 billion vehicle miles traveled (VMT) in 2035 and an extra 28.5 billion VMT cumulatively from 2010 to 2035 compared to the Trend. With greater use of alternative transportation modes, the Recentralization scenario forecasts lower VMT than the Trend. This scenario could reduce annual VMT in 2035 by 1.7 billion compared to the Trend and by 3 billion compared to the Sprawl scenario. Over the 26-year life of the *Connections* Plan, the Recentralization scenario could reduce VMT by 39 billion miles compared to the Trend.

2035 Peak-Hour Congestion by Scenario



Source: DVRPC 2008

Net Change in Annual VMT (Billions) by Scenario: 2005-2035



Source: DVRPC 2008

Fewer VMT in the Recentralization scenario will likely reduce the number of vehicle crashes in 2035, an estimated reduction of 4,200 compared to the Sprawl scenario, and 2,200 fewer crashes than the Trend.

Less driving means less time spent on congested roadways. In 2035, the Recentralization scenario could reduce person hours of delay due to congestion by 24 million hours regionwide, or four hours per capita, compared to the Trend; and by 56 million person hours of delay, or nine hours per capita, compared to the Sprawl scenario.

The region will need to make investments in new transportation capacity in order to meet the needs of population growth and to maintain economic competitiveness. The more compact nature of the Recentralization scenario means that transit and alternative transportation can play a major role in fulfilling future travel needs. The more decentralized Sprawl scenario will likely mean that new or widened roads will be the primary solution to meeting future travel demand.

The Choice for a Better Future

Based on this analysis of different scenario impacts to land use, transportation, the environment, and economic competitiveness, the Recentralization scenario offers the best solutions for a sustainable future. This scenario offers a superior quality of life by increasing mobility choices, preserving more open space, and reducing demand for energy, which lowers household and business expenses. Denser, more compact, mixed land uses can shorten distances between origins and destinations, which encourages alternative forms of transportation. Less energy use helps to reduce CO_2 emissions, making the region more sustainable. By spending less on replicating existing infrastructure, more money can be invested in green and energy-efficient technologies or alternative fuels. This, in turn, will help ensure that the region remains economically competitive in a fast and ever-changing world.

The Scenario Comparison Index compares a key set of summary indicators by indexing the Trend scenario estimates at a value of one and taking a ratio of the other two scenarios compared to the Trend. This indicates the magnitude of impact of each of the scenarios on various regional goals. Each indicator is arranged so that a larger number is considered to be a better outcome for the region.

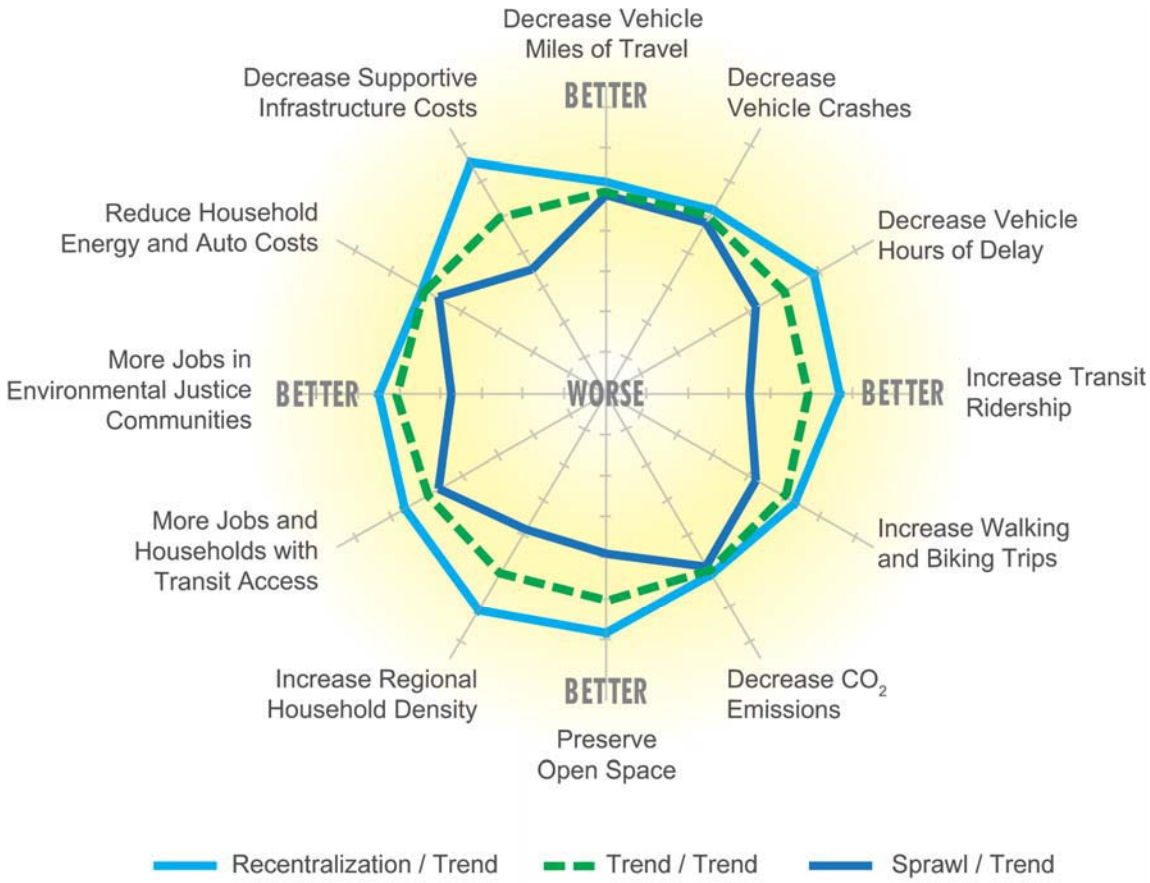
A Vision for the Future

The what-if scenario analysis is intended to spur discussion of the long-range planning process and the region's vision for the future by analyzing the impacts of two extreme land use scenarios. Neither of these scenarios is likely to occur, but by quantifying their impacts, we can more fully take into account some of the hidden costs involved in different land development patterns. To further engage the region's residents in identifying a preferred scenario and discussing a shared vision for the future, the scenarios were

presented at each of the nine county workshops that DVRPC conducted as part of the *Connections* public outreach campaign.

Community responses from the county outreach meetings largely supported the Recentralization scenario. While support for the principles underlying the Recentralization scenario was widespread, many workshop attendees also expressed an opinion that the Recentralization scenario did not adequately address future growth in the region. Based on feedback from the county workshops, the future vision for the region that is outlined in the *Connections* Plan incorporates many aspects of the Recentralization scenario. It augments that scenario with additional development outside core cities and developed communities, but which is focused in areas that are appropriate for future development. Such future growth areas are contiguous to existing development and have either existing or planned water and sewer service and proximity to the region's transportation network.

Scenario Comparison Index



Source: DVRPC 2008

CHAPTER 4

Key Plan Principles

The *Connections* Plan is built around four key Plan principles that reflect regional concerns. The principles were identified based on prioritizing the existing *Destination 2030* Plan goals that were found to need additional attention through the Tracking Progress exercise and the results of the online survey conducted at the onset of the *Connections* Plan development. The four key Plan principles are each related to one of the four factors considered in the Plan: the environment, land use, economic competitiveness, and transportation. The key Plan principles were presented during the county workshops and focus groups held to solicit public input. Participants were asked if they supported the principles and to identify any challenges in implementing them. The outreach process found strong support for each of the principles and identified several challenges to implementation of the principles. Each key principle is outlined below and each section contains pertinent issues and challenges related to the principle, as well as a set of goals and policies to implement the principle.

Principle: Manage Growth and Protect Resources

Between 1970 and 2005, 320,000 acres of open space were lost to development, or 25 acres each and every day for 35 years. The continued disappearance of our open space has resulted in significant negative consequences for our environment and quality of life. Our open spaces naturally help to improve our air and water quality, contribute to our region's character, and even return economic value to our region. Further, they serve as sources for fresh, local, and nutritious foods and provide opportunities for recreation, relaxation, and exploration.

Most people recognize the environmental, scenic, and recreational value of open space, but many may not be familiar with the economic value or return on investment. A report commissioned by the Philadelphia Parks Alliance and conducted by the Trust for Public Land recently documented this value for Philadelphia's parks. The June 2008 report, *How Much Value Does the City of Philadelphia Receive from its Park and Recreation System,* showed the annual payback to be huge: $23 million in city revenue (tax receipts from increased property value and tourism); $16 million in municipal cost savings (from stormwater management, air pollution mitigation, and community cohesion benefits); $729 million generated in wealth for residents (from property value from park proximity and profits from tourism); and $1.1 billion in cost savings for citizens (from direct use value and health benefits). Considerable return on investment can be enjoyed by all communities that invest in preserving their open space.

The region has a wealth of natural and manmade resources that contribute

Effective growth management and open space preservation will:

- Limit the need for ever-expanding water, wastewater, and transportation infrastructure, which is becoming increasingly difficult to finance, build, and maintain.
- Preserve natural features, including important habitat areas, woodlands, stream buffers, and wetlands. These features maintain surface water quality, reduce flooding, recharge groundwater, improve air quality, strengthen biodiversity, enhance personal health, and make the region more attractive.
- Decrease dependence on the automobile for personal mobility, leading to lower levels of air pollution, less dependence on fossil fuel energy, and fewer greenhouse gas emissions.
- Provide more opportunities to live, work, and play in walkable, pedestrian-friendly communities served by high-quality, efficient transit.
- Preserve farmland and strengthen the local agricultural industry, thereby enhancing local food production at a time when rising energy prices and climate change are making long-distance food transport increasingly cost prohibitive.
- Prevent outward expansion of suburban development into rural communities, allowing them to maintain their character and preserve their unique identity as historic and culturally significant places.

to a superior quality of life for the region's residents. However, many of these resources are endangered by sprawling development patterns and require increased stewardship. The *Connections* Plan has for the first time documented historic and cultural resources to signify the importance of recognizing where these resources are located and incorporating them into the planning process. The Plan also recognizes that the loss of open space and sprawling development patterns are not sustainable, and that the need to accelerate and coordinate growth management and land protection activities is urgent.

Goal: Manage Growth and Preserve Open Space

During the last several decades, Greater Philadelphia's agricultural lands, wooded lands, and natural areas, collectively referred to as "open space," have been continuously vanishing, while the amount of developed land has steadily increased. This trend is largely the result of sprawling land use patterns, not absolute population growth. Between 1970 and 2005, 320,000 acres were converted to developed uses, an increase of 50 percent, while population grew by only seven percent. This combination of low-density sprawl and open space consumption has long-term negative consequences for the environment, land use, personal mobility, the transportation system, and the competitiveness of the regional economy.

Reversing the current land consumptive trend will require the use of growth management and open space preservation techniques. Smart growth policies, strategic land preservation, market-based conservation, and regulatory land use tools will be needed to build livable communities, improve environmental quality, create energy-efficient land use patterns, and strengthen economic competitiveness. In short, growth management and open space preservation are complementary building blocks of a sustainable future.

The negative effects of land consumption and the loss of open space on the natural environment are significant. The ability of lands to capture and store stormwater, filter pollutants, and ameliorate flooding is compromised by the loss of natural vegetation, wetlands, and woodlands. Likewise, the loss of healthy forested headwaters, vegetated riparian buffers, and naturally functioning floodplains diminishes surface water quality, lowers biological productivity, and hinders groundwater recharge, depleting aquifers and lowering dry-weather flows. At the same time, open space loss diminishes and fragments natural habitats, thereby decreasing biodiversity, stressing threatened and endangered species, and

making natural areas more susceptible to invasive plants and pests.

All of these environmental impacts have direct consequences for local communities. Surface waters are an important source of drinking water, and without adequate protection, the cost of providing clean water for drinking and other uses will steadily increase, impacting the region's economic competitiveness. Natural areas store and dissipate storm waters and act to minimize the damages and costs associated with flooding. Soil productivity, nutrient cycling, carbon storage, and biodiversity are all negatively impacted by the loss of wetlands, woodlands, and other types of open space.

In addition, land consumption negatively impacts the region's farmland. Even though farmland in the region is some of the most productive in the nation, it is the land use type most likely to be converted to developed uses. Between 1990 and 2005, the region lost over 126,000 acres of farmland, or approximately 8,500 acres per year. This loss of agricultural land threatens the viability of the agricultural industry and reduces the availability of local food at a time when the demand for fresh, local food is beginning to experience double-digit growth. Finally, and perhaps most noticeably, unmanaged growth and the loss of open space strain the region's transportation infrastructure, diminish community character, limit opportunities for interaction with nature, and decrease overall quality of life. As open space is consumed, our region's communities increasingly lose their unique identity and blend together in a continuous sprawling, often homogeneous pattern. As mobility options become more limited, residents find it more difficult to access natural areas, and the aesthetic pleasures and quality-of-life benefits provided by forests, fields, and farms become increasingly rare.

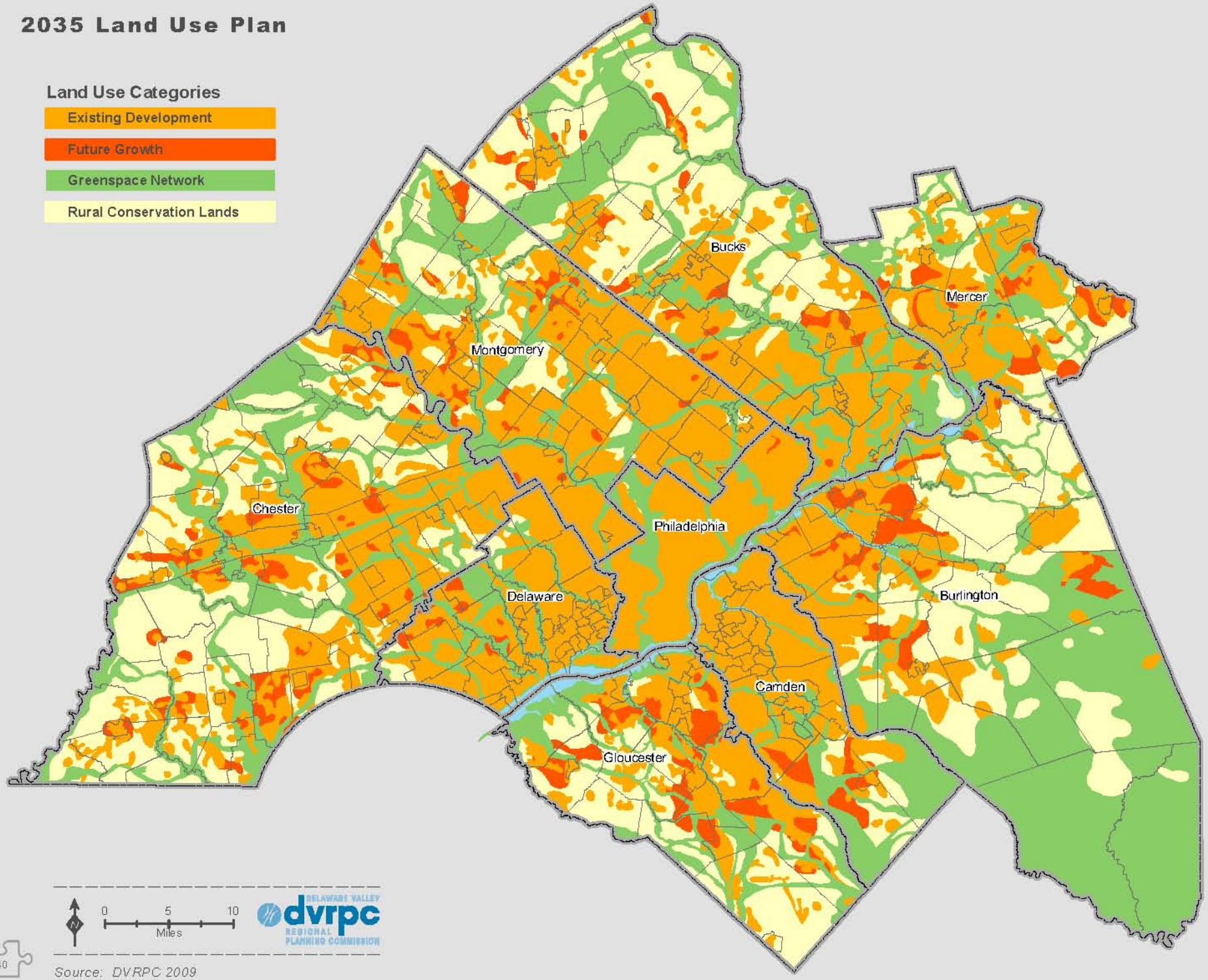
Land Use Plan

The *Connections* Land Use Plan defines a regional vision for growth management and open space preservation. The Land Use Plan Map comprises four layers: Existing Development, Future Growth Areas, Rural Conservation Lands, and the Regional Greenspace Network. Together, these areas envision a clean and sustainable environment, where key natural resource areas and agricultural lands are protected, open space is provided in an interconnected network, fragmentation of rural areas is drastically reduced, and new greenfield development is constrained to designated future growth areas, where supporting infrastructure is in place or planned. At the same time, *Connections* proposes concentrating most new growth in the form of infill and redevelopment into the region's existing developed areas. Both new development and redevelopment should be focused into the region's centers, ranging from the "Metropolitan Center" of Center City, Philadelphia, down to "Planned Town Centers." This vision for the region's centers-based development strategy over the next 26 years is conceptually depicted on the Planning Areas and Centers Map. The following section on *Developing Livable Communities* includes the Planning Areas and Centers Map and explains the centers concept in more detail.

With just over one million acres of undeveloped, unprotected land remaining in the region, the *Connections* Plan proposes protecting one-half–500,000 acres–by 2035. These lands should be strategically located in the Greenspace Network and Rural Conservation Lands to protect sensitive natural areas, create interconnected networks of greenspace, and preserve key agricultural areas. This open space system will enhance environmental quality, improve and maintain surface water quality, provide abundant passive recreational opportunities, strengthen the region's agricultural economy, create a natural framework for the creation of livable communities, and eliminate the need to extend costly infrastructure into rural areas.

Accomplishing this goal will require a combination of efforts, including acquisitions, conservation easements, purchase of development rights, market-based conservation mechanisms, and land use regulations. It will also require the creation of compact, mixed-use, diverse communities that are able to attract and maintain residents by offering a high quality of life.

2035 Land Use Plan



Source: DVRPC 2009

Greenspace Network

The *Connections* Plan proposes linking and expanding the region's existing protected natural areas into a Greenspace Network, where parks, forests, meadows, stream corridors, and floodplains are joined together in an interconnected system. The Greenspace Network is based on the twin principles of protecting core natural resource areas and linking them with greenways to create a connected system of naturally vegetated open space spanning urban, suburban, and rural areas to maintain and improve ecological health, enhance recreational opportunities, ameliorate the impacts of sprawl, and improve quality of life in the region's communities.

The vision of the Greenspace Network is to permanently protect these currently unprotected acres through acquisitions, easements, land use regulations, and growth management. The network is broken down into approximately 100 distinct "greenspace corridors." Each of these corridors is named to promote its identity and brand it as a unique preservation project. The Greenspace Network is shown on the Land Use Plan Map and also on the Greenspace Network Map, where each individual greenspace area is labeled.

The Greenspace Network reflects numerous regional high-priority environmental goals. First among these is the need to maintain and improve surface water quality. Key strategies for improving water quality include protecting and restoring naturally vegetated riparian buffers, naturally functioning floodplains, and wetlands. The Greenspace Network will contribute directly to realizing these strategies.

Protecting critical habitat areas and the region's remaining large, intact ecosystems, such as the Pinelands, Highlands, and Big Woods, is another key regional environmental goal. The Greenspace Network complements ongoing efforts to conserve these high-value ecosystems.

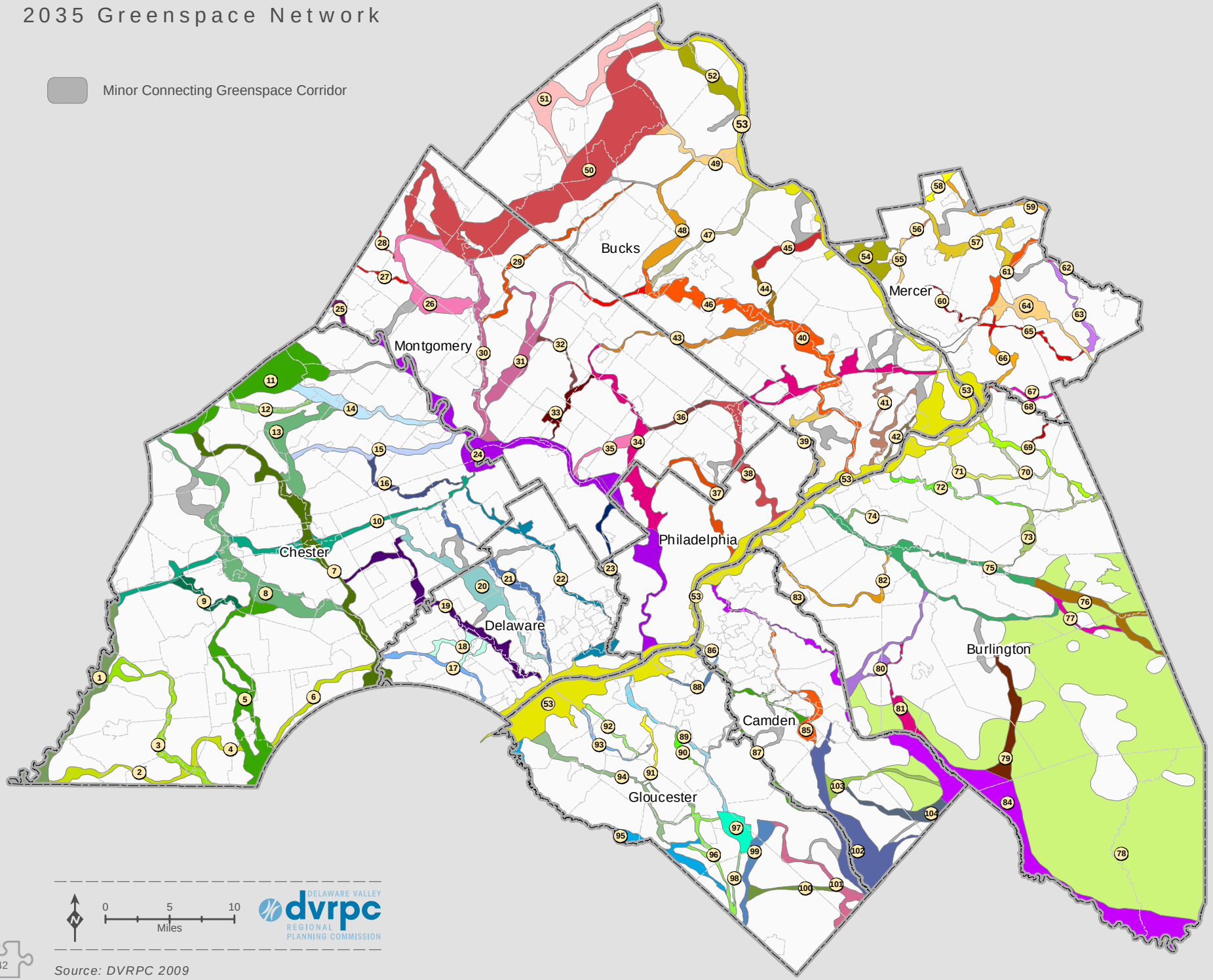
Finally, the Greenspace Network is a blueprint for creating a system of landscape-scale green spaces interspersed throughout the region's urban and suburban core. Relatively large-scale green resources in developed communities maintain neighborhood identity, manage stormwater, improve local air quality, and provide opportunities for passive recreation within easy reach of population centers. Furthermore, urban and suburban greenways greatly enhance the quality of life in more densely developed areas, making them more attractive and appealing places to live, work, and play. Enhancing natural amenities in urban areas boosts property values, encourages revitalization, spurs infill development, and reduces development pressure in rural areas.

Rural Conservation Lands and Conservation Focus Areas

As defined on the Land Use Plan Map, Rural Conservation Focus Areas depict large agricultural, natural, and rural areas worthy of heightened preservation efforts by governments and nonprofit land trusts. The Rural Conservation Lands contain villages and scattered suburban development, but they remain mostly unfragmented and their integrity can be maintained through strategic acquisitions and easements, land management, and appropriate forms of growth. The Rural Conservation Lands are not "no-growth zones," but instead are areas whose natural, agricultural, and

2035 Greenspace Network

Minor Connecting Greenspace Corridor



0 5 10 Miles

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Source: DVRPC 2009

Greenspace Corridors

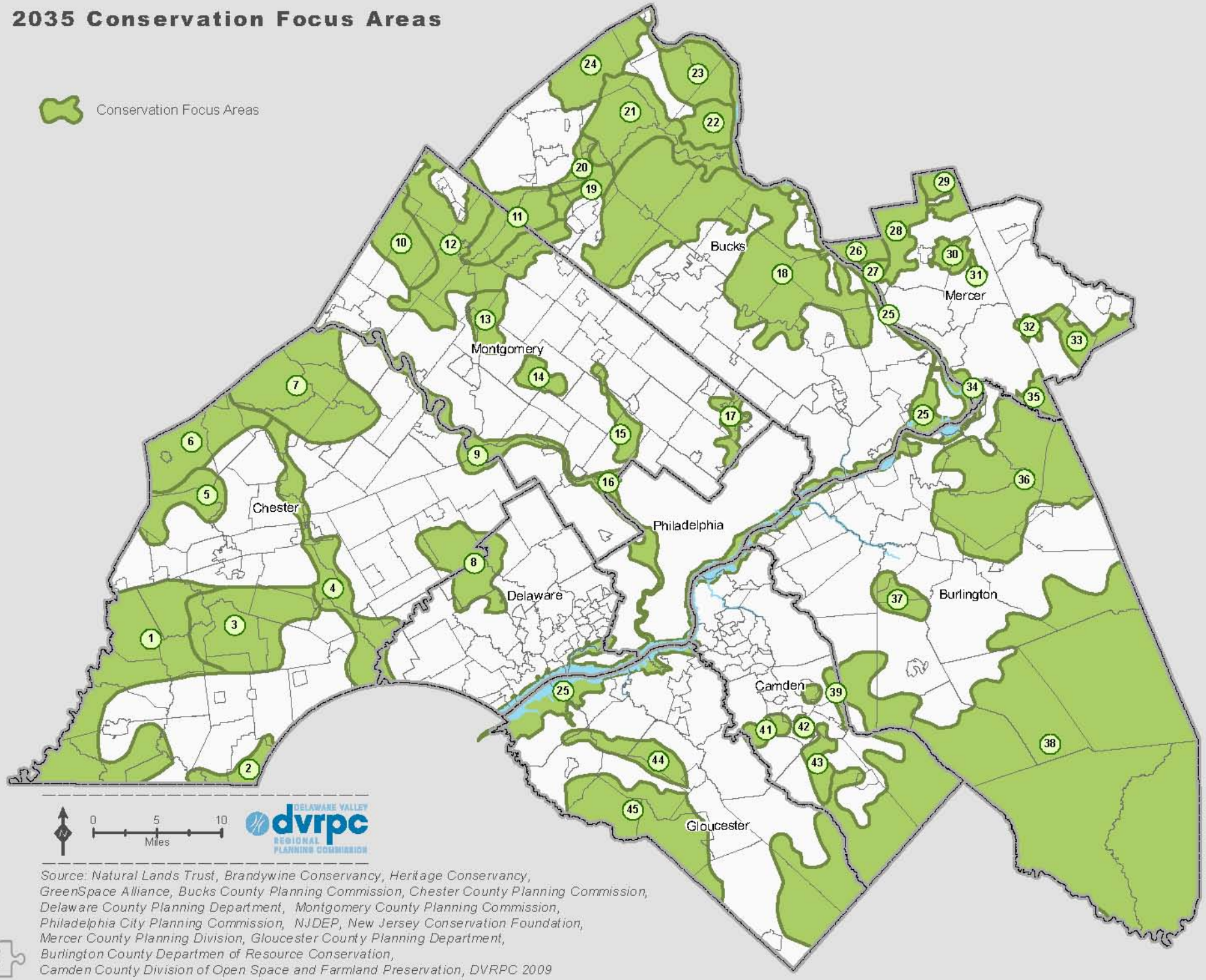
1. Octoraro Creek
2. Serpentine Barrens
3. Big Elk Creek
4. White Clay-Ways Run
5. White Clay Creek-Doe Run
6. Delaware Arc
7. Brandywine Creek
8. West Branch Brandywine Creek
9. Buck Run
10. Great Valley Ridgelines
11. Big Wood Corridor
12. Warwick-Elverson
13. Marsh Creek-Beaver Run
14. French Creek
15. Pickering Creek
16. Valley Creek-Pigeon Run
17. Harvey Run-Naaman's Creek
18. West Branch Chester Creek
19. Chester Creek
20. Ridley Creek
21. Crum Creek
22. Darby Creek
23. Cobbs-Mill Creek
24. Schuylkill River
25. Manatawny Creek
26. Swamp-Deep Creek
27. Minister Creek
28. Middle Creek
29. East Branch Perkiomen Creek
30. Perkiomen Creek
31. Skippack Creek
32. Towamencin Creek
33. Stony Creek
34. Wissahickon Creek
35. Plymouth Meeting
36. Cross County Corridor
37. Tacony-Cresheim Creek
38. Pennypack Creek
39. Poquessing Creek
40. Neshaminy Creek
41. Mill-Queen Anne Creek
42. Delaware Canal
43. Little Neshaminy Creek
44. Mill Creek
45. New Hope-Ivyland
46. West Branch Neshaminy
47. Paunnacussing-Pine Run
48. Peace Valley-Deep Run Creek
49. Tohickon Creek
50. North Woods
51. Quakertown-Cooks Creek
52. Tinicum-Nockamixon
53. Delaware River
54. Washington Crossing
55. Jacobs Creek
56. Pennington Mountain
57. Stony Brook
58. North Hopewell
59. North Mercer
60. Shabakunk-Ewing
61. Delaware and Raritan Canal
62. Millstone River
63. Big Bear Brook
64. Assunpink Creek
65. Miry Run
66. Pond Run-Back Creek
67. Doctors Creek
68. Crosswicks Creek
69. Blacks Creek
70. Bacons Run
71. Crafts Creek
72. Assicunk Creek-Annaricken Brook
73. Budd Run-North Run
74. Mill Creek
75. Rancocas Creek
76. Mount Misery
77. Bishpams Mill Creek
78. Pinelands Conservation Areas
79. Batsto-Friendship
80. Southwest Branch Rancocas Creek
81. Haynes Creek
82. Pennsauken-Masons
83. South Pennsauken Creek
84. River to Bay
85. Cooper River
86. Little Timber
87. Big Timber
88. Woodbury Creek
89. Mantua Creek
90. Chestnut Branch
91. Edwards Run
92. Repaupo Creek
93. Pargey Creek
94. Raccoon Creek
95. Oldmans-Reed
96. Still Run (Maurice River)
97. Glassboro Wildlife Management Area
98. Little Ease Run
99. Scotland Run
100. Indian-Faraway
101. Hospitality Branch
102. Great Egg Harbor River
103. Sleeper Branch
104. Pump Branch

recreational values should be protected, while allowing for limited growth that is in character with each region.

For planning purposes, the region's Rural Conservation Lands have been broken down into subareas and branded on the Conservation Focus Areas Map. This map depicts lands similar to the Rural Conservation Lands layer, but individual areas are defined and named based on their unique physiographic, vegetative, and land use characteristics. Examples of such areas include Chester County's Big Woods and the New Jersey Pinelands.

In general, the Focus Areas are either agricultural or natural in character, although some Focus Areas are a mix of the two land use types. Focus Areas may overlap with the Greenspace Network, but they are larger and encompass scattered, very low-density development sites, whereas the Greenspace Network is conceived of as an unbroken system of naturally vegetated open space. In total, the region contains approximately 45 Focus Areas. Protecting unprotected open space and/or promoting context-sensitive, centers-based growth are key policy recommendations for both the Conservation Focus Areas and the Rural Conservation Lands.

2035 Conservation Focus Areas



Source: Natural Lands Trust, Brandywine Conservancy, Heritage Conservancy, GreenSpace Alliance, Bucks County Planning Commission, Chester County Planning Commission, Delaware County Planning Department, Montgomery County Planning Commission, Philadelphia City Planning Commission, NJDEP, New Jersey Conservation Foundation, Mercer County Planning Division, Gloucester County Planning Department, Burlington County Departmen of Resource Conservation, Camden County Division of Open Space and Farmland Preservation, DVRPC 2009

Conservation Focus Areas

1. Southwest Chester Agricultural Region
2. White Clay
3. King Ranch Region
4. Brandywine Valley
5. Sadsbury Woods
6. Upper Brandywine Agricultural Region
7. Big Woods
8. Ockehocking
9. Schuylkill River
10. Montgomery Agricultural Region
11. Unami Hills
12. Upper Perkiomen Headwaters
13. Spring Mountain
14. Worcester
15. Upper Wissahickon
16. Miquon
17. Pennypack Preserve
18. Bucks Agricultural Heritage Area
19. Rock Hills
20. Quakertown Swamp
21. Tohickon Watershed-Nockamixon
22. Tinicum Watershed
23. Palisades
24. Cooks Creek Watershed
25. Delaware River
26. Baldpate Mountain Preserve
27. Washington Crossing
28. Hopewell Agricultural Area
29. Hopewell Boro Greenbelt
30. Mercer Park Northwest
31. Lawrence Agricultural Area
32. Washington Town Center Greenbelt
33. Lower Assunpink Ag Region
34. Crosswicks Marsh
35. Hamilton Agricultural Area
36. Burlington County Agricultural Region
37. Barkers Brook
38. Pinelands Rural and Preservation Areas
39. Cooper, Mullica, and Rancocas Headwaters
40. Headwaters Hub
41. Camden NHP Sites
42. Pine Valley
43. Great Egg Harbor Headwaters
44. Gloucester County Farm Belt A
45. Gloucester County Farm Belt B

Policies to Manage Growth and Preserve Open Space

- Manage growth by focusing new development as infill and redevelopment in existing developed areas, and by targeting new development to designated Future Growth Areas on the Land Use Plan Map.
- Promote compact, centers-based development through smart growth tools and techniques, such as transit-oriented development (TOD); traditional neighborhood design (TND); transfer of development rights (TDR) programs; and revitalization and stabilization of existing development.
- Direct major preservation efforts to protect and restore the Greenspace Network, the Conservation Focus Areas, and the Rural Conservation Lands.
- Employ a range of regulatory, voluntary, and funding techniques, including fee-simple acquisitions, conservation easements, locally funded open space programs, statewide preservation trust funds, municipal natural resource protections plans and ordinances, and market-based conservation, such as TDR programs.

Goal: Manage Stormwater and Improve Water Quality

Open space loss and development have a detrimental effect on surface water quality due to the loss of natural vegetation and increased impervious surfaces. Water quality impairments are primarily the result of stormwater runoff and nonpoint source pollution from streets, parking lots, driveways, buildings, lawn areas, and agricultural fields that lack adequate vegetative buffers. Some examples of nonpoint source pollutants contained in stormwater runoff include the following: excess fertilizers, herbicides, and insecticides from residential lawn areas and agricultural lands; oil, grease, rubber, and toxic chemicals from parking lots and roadways; sediment from improperly managed construction sites; salt from streets treated during winter precipitation events; and bacteria and nutrients from livestock, geese, pet wastes, and faulty septic systems.

Increased stormwater runoff also impacts stream channel conditions. As an area becomes developed, stormwater is rapidly directed to streams from impervious surfaces. Scientists have found that levels of impervious cover of 10 percent or more within a subwatershed are directly linked to enlargement of stream channels, streambank erosion, lower dryweather flows, higher stream temperatures, lower water quality, and declines in aquatic life diversity.

Policies to Manage Stormwater and Improve Water Quality

- Protect and restore vegetated riparian buffers, maintain naturally functioning floodplains, and preserve wetlands and wetlands buffers to manage stormwater and improve water quality. These policies are inherent in the Greenspace Network described above.

- Promote the use of community-scale green infrastructure through techniques such as green streets, green roofs, rain gardens, bioswales, and naturalized retention basins to imitate natural processes to infiltrate stormwater, reduce flows, improve water quality, and enhance community livability.

Goal: Improve Air Quality

The region continues to struggle to attain the federal air quality standard for ground-level ozone and fine particulate matter, two of the six criteria pollutants monitored by the Environmental Protection Agency. Nonattainment of these standards is not only a concern for the health of the region's citizens, but also risks the loss of federal transportation funding. Ozone in the upper atmosphere protects us from the sun's harmful rays. There, ozone plays an important role protecting life on earth. At ground level, where we breathe, ozone can be harmful to our lungs and the environment. In the summer, sunlight and heat can "bake" pollutants and create ground-level ozone, also known as smog. Inhaling high levels of ground-level ozone damages your lungs. This may feel like a sunburn on your lungs.

Particulate matter, or particle pollution, is the term for tiny drops of liquid or small bits of dust. Some particles are large enough to be seen as soot or smoke. Other particles are so small that they can only be seen with an electron microscope. Particle pollution comes from a variety of natural and manmade sources, such as cars, power plants, and forest fires. Particle pollution is a year-round problem.

The automobile contributes significantly to our pollution problem, and planning for a more sustainable future requires reducing demand for trips and increasing the use of transit, walking, and bicycling through better land use practices, reducing congestion, which contributes to pollution through idling of vehicles, and cleaner vehicles.

Policies to Improve Air Quality

- Forecast poor air quality days and request temporary, voluntary changes in behavior to reduce pollutants, particularly on days when pollution is forecast to exceed the standard.
- Advance strategies and projects that reduce motor vehicle emissions.

Goal: Increase Local Food Production and Distribution

The *Connections* Plan outlines a strategy for recentralization based on the land use, transportation, environmental, and economic competitiveness benefits that such a development pattern would bestow. The global food system will most likely go through recentralization as well, and more of the world's urbanizing populations will need to be fed by agricultural resources closer by. In the near future, countries that are primarily agricultural exporters may retain more food products for their domestic markets. For example, due to poor growing seasons in the spring and summer of 2008, both China and India restricted the amount of rice exported to other international markets in order to meet domestic demand. As a result, the price of rice in U.S. grocery stores spiked. This example illustrates the risk for Greater Philadelphia, and similarly the rest of the United States, on relying on agricultural resources further and further away while we are losing viable farmland and a successful agricultural industry.

There are a myriad of issues facing the global and regional food systems, including:

Photo by: Marisa McClellan

- Land constraints: food system activities take up a significant amount of land and farmland in metropolitan areas, which are facing extreme development pressures;
- Contradicting health effects: America is experiencing rising incidences of both hunger and obesity;
- Food access: availability of healthy and affordable foods in low-income urban and rural areas is an increasing problem;
- Energy: the food we eat takes a considerable amount of fossil fuel energy to produce, process, transport, and dispose of; and
- Economic development: the food system represents an important part of the regional economy; food manufacturing can provide much needed low-skill jobs; local food production, preparation, and distribution offers entrepreneurial opportunities; and agricultural products are among the nation's strongest and largest exports.

Today's food system is a product of significant technological advances that produces, for the most part, an abundant and safe supply of food to most

people in this country. These advances in the food system have allowed more Americans to specialize in labor. For example, in the 1900s, 30 percent of the U.S. workforce worked on farms; today, less than two percent work on farms. In addition, today's global food system has also contributed to the increased incidence of obesity and diet-related diseases, loss of diverse culinary traditions, and environmental degradation, including water pollution and greenhouse gas emissions.

Meanwhile, the United States and Greater Philadelphia are losing irreplaceable agricultural lands to urban development. Between 1990 and 2005, the DVRPC region lost over 126,000 acres of agricultural land. Recently, media attention and consumer interest have espoused the virtues of "eating local" to support local farmers, enjoy better tasting seasonal food, lessen the environmental impact of large-scale agricultural operations, reduce food travel distance from farm to plate, and know where our food comes from. Regardless of why a person chooses to buy local food, a stronger regional food system will increase the region's food security and the regional economy, making Greater Philadelphia a more competitive metropolitan area.

Policies to Increase Local Food Production and Distribution

- Enhance coordination between all food system stakeholders, ranging from the private sector to the public sector, from local food advocates to hunger relief organizations, from farmland preservation coordinators to economic development agencies, in order to collaborate on solutions for the evolving food system.
- Incorporate farming and food into economic development policies and funding programs in recognition of the fact that the food system accounts for 10 to 30 percent of all economic activities within the region.
- Forge partnerships between land trusts, public agencies, and future farmers to increase food production on protected lands within the region.
- Facilitate local food production and distribution in rural, suburban, and urban areas through supportive land use ordinances.

Goal: Preserve Historic Resources and Cultural Landscapes

The region's rich past is reflected in its tremendous variety and number of historic and cultural resources. From Native American archeological sites to early Swedish settlements, and from Independence Mall to the hallowed grounds of Valley Forge, the region's history is incorporated into and enriches the fabric of Greater Philadelphia's present-day life. The nine-county region's wealth of historic resources is underscored by the number of national and historic landmarks, sites, and districts on the national and state registers of historic places, state- and nationally recognized historic landscapes and heritage areas, and sites protected through local historic designations. In addition, the region has a vast array of museums, libraries, and active historic and cultural organizations committed to preserving and interpreting the region's historic resources. However, despite these circumstances, the region's historic and cultural resources are threatened by demolition, neglect, encroaching sprawl, incompatible land uses, poor planning, and insensitive design.

Historic and Cultural Resources

A **historic resource** can be a building, structure, district, archeological site, or area that is significant in, or representative of, the history, architecture, or culture of a given community, state, or country. A **cultural landscape** is another type of historic resource that includes not just buildings and structures, but also the lands, or "landscapes," around those buildings and structures that define their context. Cultural landscapes reveal aspects of our region's origins and development through their form, features, and characteristics. They also point toward the region's interdependence on its natural resources.

A **Historic District** is a group of buildings, properties, or sites that have been designated as historically or architecturally significant. The National Park Service defines a historic district as possessing "a significant concentration, linkage, or continuity of sites, buildings, structures, or objects

united historically or aesthetically by plan or physical development." There are two primary types of historic districts: "National Register listed and eligible historic districts" designated at the national level by the National Park Service, and "local historic districts" designated by local municipal governing bodies. Local district regulations can be enforced through a zoning code, or, in the case of Pennsylvania, through the Historic District Act, and are typically more protective of historic resources than National Register districts. Districts can, and often do, have both national and local designations, although the boundaries of local and national districts are not always identical.

The following map depicts only those districts that are listed on the National Register of Historic Places, making them National Register Historic Districts. The region also contains many hundreds of local historic districts, although these have not all been mapped at the regional scale. As defined in the Historic Sites Act of 1935, **National Historic Landmarks** are historic

resources that are significant to the nation and its history. The region has 116 National Historic Landmarks.[6] All National Historic Landmarks are also listed on the National Register of Historic Places. In addition to landmarks, the region also boasts two National Historic Parks: Independence Mall and Valley Forge. Independence Hall, the centerpiece of Independence Mall National Historic Park, is also a UNESCO World Heritage Site.[7] The region's National Historical Landmarks and National Register Historic Districts are depicted on the accompanying map.

Archaeological sites, like historic buildings, are considered cultural resources. If they meet the eligibility requirements set forth in the National Historic Preservation Act (NHPA), they may receive official historic status. Unlike historic buildings, however, archaeological sites are not always evident to the untrained eye. While some archaeological sites have obvious above-ground indicators, such as earth mounds or chimney remnants, most consist of artifacts (objects made or modified by humans, such as stone tools, pottery, bottle glass, etc.) and features (post holes, trash pits, stone building foundations, human burials, etc.) that are underground. Because this region was inhabited by humans for the last 16,000 years, the potential exists for finding archeological sites whenever excavations take place. This is significant for transportation projects, which occasionally "unearth" previously unknown archeological sites during their construction. There are two types of archaeological sites, prehistoric sites and historic period sites, which require different techniques for discovery and treatment.

National Heritage Areas

National Heritage Areas are designated by congressional act. Each National Heritage Area is governed by separate authorizing legislation and operates under provisions unique to its resources and desired goals. For an area to be considered for designation, the landscape must have nationally distinctive natural, cultural, historic, and scenic resources that, when linked together, tell a unique story about the United States. Each National Heritage Area has a "management action plan," which helps to characterize the specific histories and related resources in each region. As of June 2009, there were 49 National Heritage Areas throughout the country. Parts of three National Heritage Areas are located in Greater Philadelphia: the Delaware & Lehigh, the Schuylkill River Valley, and the Crossroads of the American Revolution.

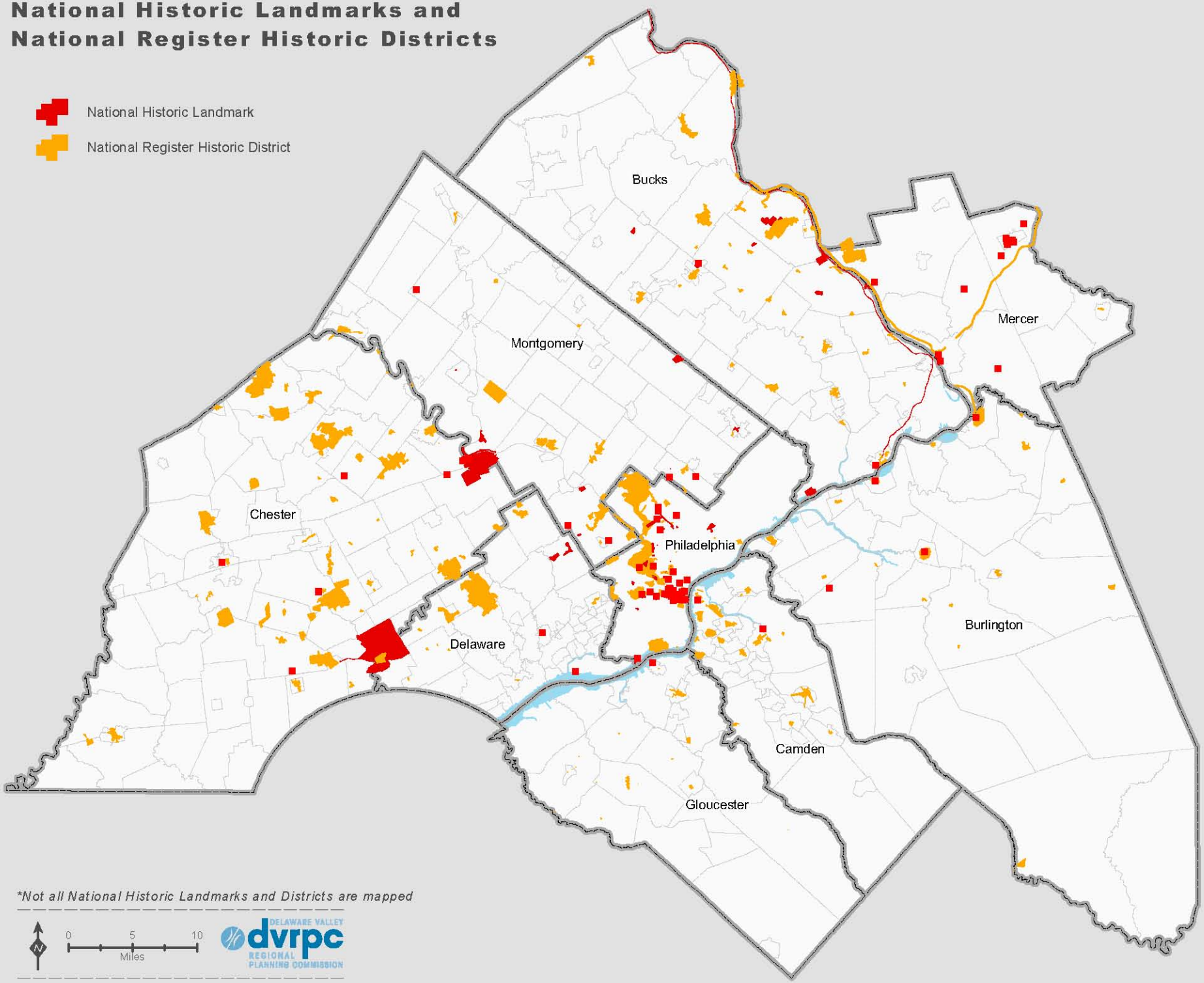
Scenic Byways

Scenic roads are also considered to be a type of cultural landscape. Scenic roads provide visually pleasant experiences for drivers, bicyclists, and pedestrians. Generally, a road can have two types of scenic value: the immediate physical characteristics of the road and its right-of-way; and the views of natural and cultural resources from the roadway. The roadway, its right-of-way, and all land visible from the road make up the scenic road corridor.

As of December 2008, there were no National Scenic Byways in the Philadelphia metropolitan area. However, both the New Jersey and Pennsylvania departments of transportation designate scenic roadways, making those roadways eligible for federal funds to pay for paved shoulders, interpretive signs, and scenic overlooks. This designation also limits outdoor advertising. Greater Philadelphia has five different roads designated as scenic byways, including: Interstate 476 (the "Blue Route") in Delaware County; the Route 30 Exton Bypass in Chester County; Routes 52 and 162 (the Brandywine Valley Scenic Byway) in Chester and Delaware counties; Route 29 (the Delaware River Scenic Byway) in Mercer County; and parts of County Route-542, US 9, and NJ-167 (the Southern Pinelands Heritage Trail) in Burlington County.

[6] See National Park Service for more information on the region's National Historic Landmarks. www.nps.gov/history/nhl/
[7] United Nations Educational, Scientific and Cultural Organization. http://whc.unesco.org/en/list/78

National Historic Landmarks and National Register Historic Districts



Source: DVRPC 2009, NPS, PHMC, NJSHPO

Transportation Impacts on Historic and Cultural Resources

Transportation projects often impact the integrity of historic and cultural resources. There are several federal and state laws that were enacted to avoid and minimize these impacts and disturbances, including SAFETEA-LU, the National Environmental Policy Act (NEPA), Section 106 of NHPA,[8] the Pennsylvania History Code, and the New Jersey Register of Historic Places Act. All federally funded transportation agencies must follow federal laws and plan their projects accordingly. As part of this process, state historic preservation offices work with federal agencies to identify historic resources and avoid or minimize any potential adverse effects on them during the planning, permitting, design, and construction of federally funded and licensed projects. While not subject to NEPA, nonfederally funded projects must follow state environmental review processes and comply with all applicable federal, state, and local regulations put in place to protect historic and cultural resources.

Historic Preservation Efforts

Interest in the region's historic and cultural sites is strong. Many communities have protected their historic resources by creating historic zoning districts and establishing historic architectural review boards and historic commissions.[9] Other communities, nonprofit groups, and individuals are investing in historic sites as catalysts for redevelopment. Additionally, the region markets its history and heritage, attracting millions of tourists from throughout the country and world each year to visit its historic sites, charming towns, and scenic landscapes. Many more organizations and local governments are working on identifying, protecting, preserving, rehabilitating, and restoring the region's historic and cultural resources and landscapes as a way to increase the region's livability, enhance its "sense of place," and cultivate a unique identity.

Policies to Preserve Cultural Landscapes and Historic Resources

- Invest in the preservation, rehabilitation, and reuse of historic structures as a means to promote a community's unique identity and improve its quality of life.
- Manage growth and enhance community design through land development ordinances, design review, and local preservation planning processes in order to protect the context and integrity of historic sites and cultural landscapes.
- Preserve open space and farmland as a means to also preserve the scenic, historic, and cultural context of many historic sites in the region.
- Form closer partnerships between DVRPC, the state departments of transportation, and the state historic preservation offices (Pennsylvania Historic and Museum Commission and New Jersey State Historic Preservation Office) in order to enhance coordination and collaboration and reduce the adverse impacts of transportation projects on historic resources and scenic corridors.

[8] The review process as outlined in the National Historic Preservation Act is often referred to by the section it appears in, "Section 106."
[9] For more information on each state's historic preservation enabling laws, visit the Pennsylvania Historical and Museum Commission's website: www.phmc.state.pa.us; and the New Jersey State Historic Preservation Office's website: www.state.nj.us/dep/hpo/

Principle: Develop Livable Communities

Our region is expected to gain over 630,000 residents by 2035, which represents an increase of about 11 percent since 2005. Similarly, employment in the region is expected to increase by 370,000, or 13 percent. If current trends continue, the vast majority of this growth is projected to occur at the periphery of our region. Left uncontrolled, it will increase suburban sprawl, create the need for expensive new infrastructure, and contribute to the further disappearance of our open space and the depletion of our natural resources.

We can avert these issues through focused redevelopment to create compact, mixed-use, livable communities within and around our region's established centers of development. These livable communities–literally, places where people intuitively want to live–provide a unique sense of place, have existing infrastructure, and offer opportunities for new development and revitalization. Concentrating new growth within and around these centers will allow us to preserve open space, reduce strains on our natural resources, and create thriving, pedestrian-friendly communities that offer an improved quality of life for all residents. They will empower us to strengthen our local economies and our connections to each other and the surrounding region.

Greater Philadelphia is a complex mosaic of 353 diverse cities, boroughs, and townships. The *Connections* Plan characterizes the region's municipalities as core cities, developed communities/mature suburbs, growing suburbs, or rural areas as a means of categorizing and simplifying the types of communities and defining the corresponding long-range planning policies appropriate for each type. This categorization is shown on the Planning Areas and Centers Map. Many municipalities have within their boundaries areas that fit the characteristics of more than one of these types. Gloucester Township (in Camden County, New Jersey), for example, has neighborhoods that are fully developed, but it also has a significant number of undeveloped acres and significant forecasted population and employment growth more characteristic of a growing suburb. The intent of the Plan is to assign to each municipality the planning area type associated with the long-range planning policies that will be most beneficial to the entire community. While the Planning Areas and Centers Map is a guide to the policy direction at the regional scale, actual approaches should always relate densities and a mix of integrated uses, livable communities foster the most efficient use of land and resources.

Developing Livable Communities will:

- Revitalize neighborhoods, support economic growth, and reduce suburban sprawl.
- Create business-friendly town centers that strengthen our local and regional economy.
- Improve safety and security through stronger community connections.
- Reduce automobile dependence while promoting transit, walking, and biking as everyday modes of transportation.
- Enhance livability in our core cities, first-generation suburbs, and town centers.
- Preserve unique community and architectural character.
- Conserve open space to promote access to recreational opportunities and local foods.
- Reduce living and service delivery costs, transportation and logistics needs, and resulting pollution.
- Increase and diversify the housing stock that is centrally located near employment opportunities and transportation systems.

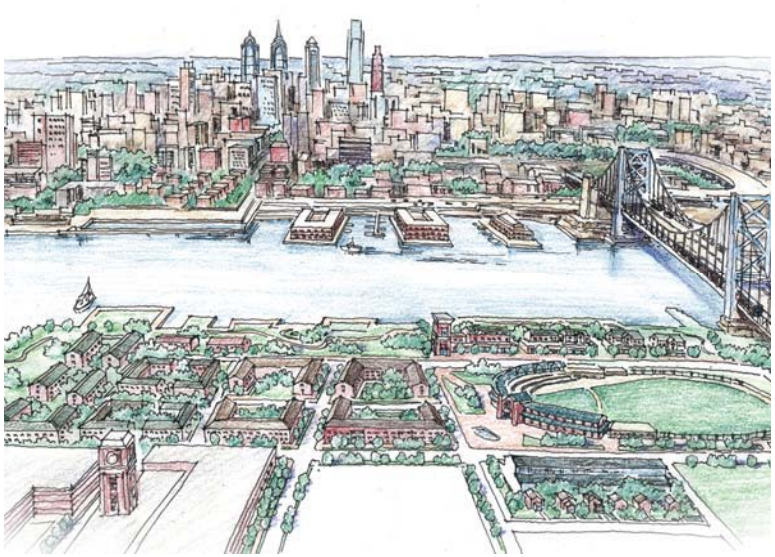
Livable communities can be found throughout the region, in core cities and their component neighborhoods; in the region's older first-generation suburbs; and in town and rural centers scattered throughout the region's suburbs and exurban areas.

The region's four **Core Cities** are Philadelphia, Trenton, Camden, and Chester. Policies that will guide future growth and development and improve livability in the core cities include redevelopment and renewal. Targeted infrastructure investment, maintenance and rehabilitation, comprehensive neighborhood revitalization, and efforts focused on reinforcing a network of social and educational programs will help to rebuild and revitalize the region's cities.

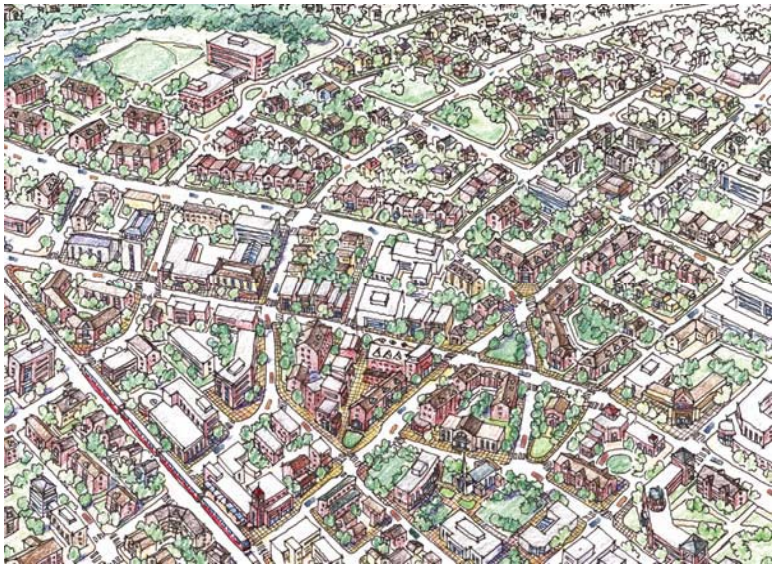
Developed Communities/Mature Suburbs are those communities that have already experienced most of their population and employment growth, and include inner-ring communities adjacent to the core cities; railroad boroughs and trolley car communities; and mature suburban townships. Many of these communities are stable and thriving, with affordable housing opportunities for young families; access to transit; safe pedestrian and bicycling environments; and a strong community identity. Others, however, are experiencing population and employment losses; have deteriorating infrastructure systems; have aging resident populations living on limited incomes but requiring more services; and have stable or declining tax bases that cannot keep pace with rising service demands. The key policies for these communities include stabilization and revitalization. Rehabilitation and maintenance of infrastructure systems and the housing stock, economic development activities (such as Main Street programs), and streetscape and signage programs can help to reinforce location advantages while stemming decline.

Growing Suburbs are communities that have a significant number or percentage of developable upland acres remaining and are experiencing or are forecast to experience significant population and/or employment growth.

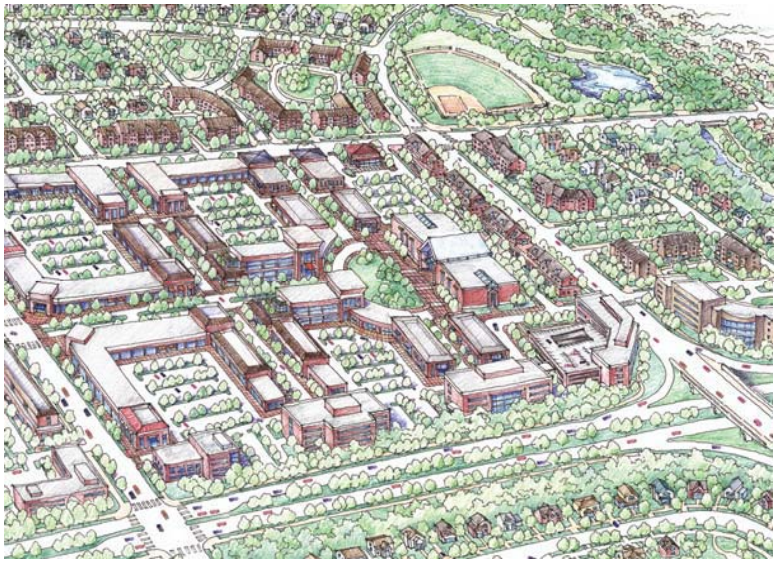
Core City



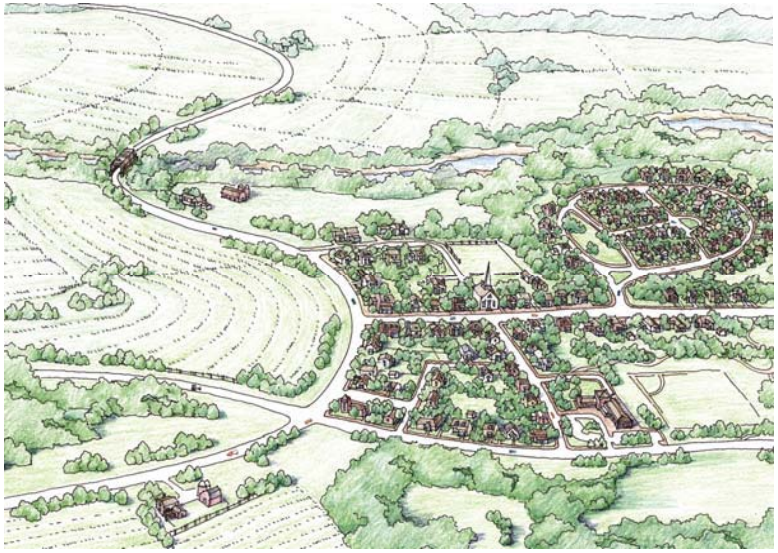
Developed Community

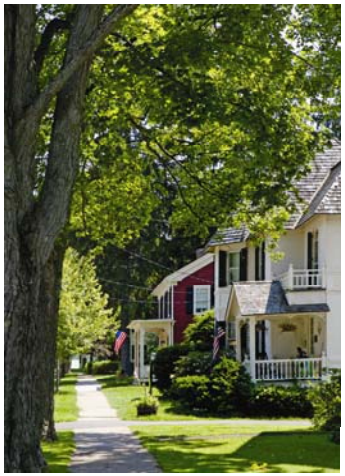


Growing Suburb



Rural Area





Key planning policies to enhance livability in these communities include growth management and community design, reflecting the need to improve the form of development, reduce congestion, and mitigate the negative impacts of unmanaged growth. Smart growth techniques that support a more concentrated development pattern with higher densities (including clustering, mixed uses, transit-oriented development, and transfer of development rights) can provide the critical mass necessary to support new transit services and other alternatives to the automobile. A key planning approach is to focus on the quality of design and architectural character, considering the location and arrangement of buildings, landscaping, signage, and other design features. Preservation and the creation of a coordinated system of open spaces and recreational opportunities is also a priority in these communities.

Rural Areas include the region's agricultural communities and communities with large remaining natural areas. The key policy approaches for these communities are preservation and limited development, including limited expansion of infrastructure systems, preservation of a rural lifestyle and village character, support for continued farming, and enhanced natural resource protection. Livable communities in these rural areas include centers that have an identifiable main street, a mix of uses, slightly higher densities than their surrounding uses, and a true sense of place.

Livable communities can be created and supported throughout the region by reinvesting in and redeveloping centers, promoting affordable housing in appropriate locations, enhancing community design, and promoting green infrastructure.

Goal: Invest in Centers

A key principle to guide the *Connections* Plan is the concept of centers. Centers provide a focal point in the regional landscape that can reinforce or establish a sense of community for local residents, while recognizing their regional and local significance. Centers serve as a basis for organizing and focusing the development landscape, while coordinating the more efficient provision of supportive infrastructure systems, including water, sewer, and transportation. They provide a focus for new development, including revitalization, infill, and adaptive reuse. By concentrating new growth around and within centers, the region can both preserve open space and reduce infrastructure costs. The densities and mixed uses inherent within centers can enhance the feasibility of walking, bicycling, and public transit as alternatives to the automobile.

The *Connections* Plan identifies a hierarchy of seven center types, shown on the Planning Areas and Centers Map, based on their role and activities within the region. The Center City/University City area of Philadelphia–bounded roughly by the Delaware River and 40th Street from Girard to Washington avenues–is identified as the region's metropolitan center. This dense, compact, mixed-use area includes the central business district and office core and major academic and medical institutions, as well as major tourist and entertainment destinations.

The Plan also identifies six metropolitan subcenters, reflecting their magnitude of jobs and commercial activity. These include the downtown areas of Trenton and Camden and the destinations of King of Prussia/Valley Forge (Montgomery County); International Airport/Navy Yard/Sports Complex (Philadelphia and Delaware counties), Cherry Hill/Mount Laurel/Marlton (Burlington and Camden counties), and the Route 1 Corridor (Mercer County).

Embedded within the region's core cities of Philadelphia, Trenton, Camden, and Chester are neighborhood centers, which are recognizable places with a mix of commercial, retail, anchor institutional, or residential activities.

- Neighborhood Centers:
  - Are located within one of the four core cities,
  - Have an identifiable main street or focal point,
  - Are walkable, with pedestrian connections, and
  - Have a unique history or sense of a community within the larger city setting.

The *Connections* Plan recognizes that each of the region's core cities is a collection of diverse neighborhoods with varying characteristics, assets, challenges, and needs, and that specific approaches and strategies for improving and revitalizing these neighborhoods will differ. The planning

policies within the core cities and their neighborhoods focus on redevelopment and revitalization through targeted investment and reinvestment.

In addition to the metropolitan center, metropolitan subcenters, and neighborhood centers, the Plan identifies four types of 2035 centers: suburban centers, town centers, rural centers, and planned town centers. The characteristics of each type are as follows:

- Suburban Centers:
  - Are significant regionwide,
  - While not necessarily single municipalities, are perceived as single "places,"
  - Generally have more jobs than residents,
  - Are defined primarily by a concentration and variety of commercial, professional, and light industrial uses,
  - Are suburban in character,
  - Are less dense than town centers,
  - Lack the integrated mix of uses found in town centers, and
  - Are generally auto dependent rather than transit oriented or pedestrian scale.
- Town Centers:
  - Have a mixture of high-density residential and commercial land use, defined as a minimum density of six people *and* three employees per developed acre,
  - Have an integrated mix of land uses,
  - Have a unique history, character, and sense of place,
  - Are of relatively higher density than their surrounding land uses,
  - Have a distinct downtown/main street area surrounded by relatively dense residential development,
  - Are pedestrian friendly and often transit oriented, and
  - Are surrounded by suburban land uses.
- Rural Centers:
  - Have a minimum density of six people *and* three employees per developed acre,
  - Have an integrated mix of land uses,
  - Have a unique history, character, and sense of place,
  - Are of relatively higher density than the surrounding area,
  - Have a distinct downtown/main street (though smaller than a town center), and
  - Are surrounded by rural and agricultural land uses.
- Planned Town Centers:
  - Have planned town-center-type development on greenfields in growing suburbs or rural areas or through redevelopment on greyfields and/or brownfields in existing developed communities, and
  - Plans call for village-type development, incorporating mixed, integrated land uses, relatively high densities, pedestrian connections, and a distinct downtown or main street.

Policies to Invest in Centers

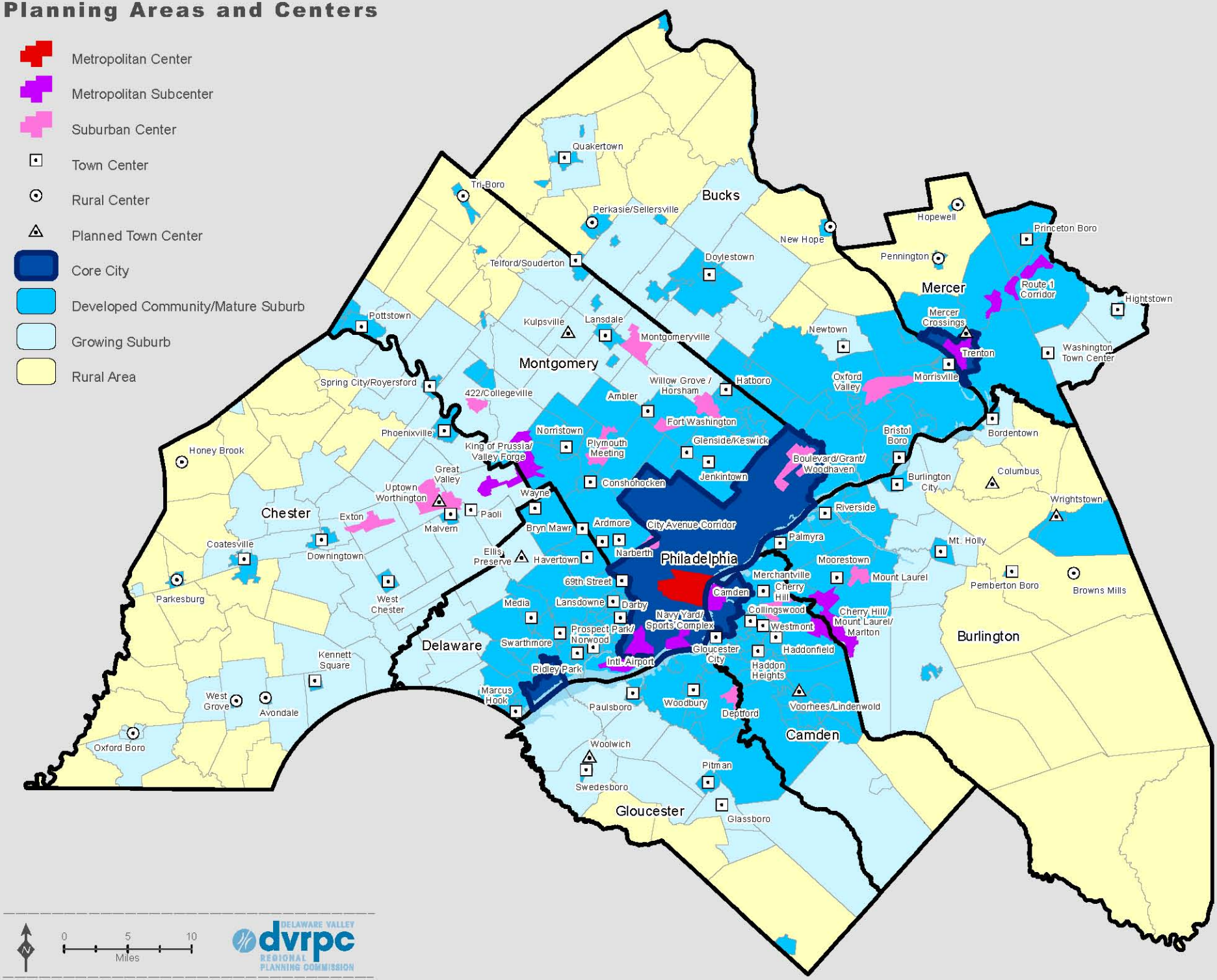
- Attract new residents and jobs to the region's cities and centers.
- Restore and maintain the existing infrastructure in identified centers.
- Target infrastructure expansions to manage growth, curtail sprawl, and encourage a more sustainable, center-based regional development pattern.
- Redevelop abandoned and underutilized brownfield and greyfield sites into thriving mixed-use areas.
- Support and reinforce social and educational programs in the region's centers.
- Revitalize neighborhoods through economic development activities (such as Main Street programs), housing rehabilitation and maintenance programs, and activities to improve the pedestrian environment (including streetscape and lighting improvements).

Greater Philadelphia Land Use Centers

County	Metropolitan Subcenters	Suburban Centers	Neighborhood Centers	Town Centers	Rural Centers	Planned Town Centers
Bucks		Oxford Valley		Bristol Borough, Doylestown Borough, Morrisville, Newtown Borough, Quakertown	New Hope Borough, Perkasie/Sellersville	
Chester		Exton, Great Valley		Coatesville, Downingtown Borough, Kennett Square, Malvern, Paoli, Phoenixville, Spring City/Royersford, West Chester	Avondale, Honey Brook Borough, Oxford Borough, Parkesburg, West Grove	Uptown Worthington
Delaware	International Airport/Navy Yard/Sports Complex		Chester Riverfront, University Crossing	Darby Borough, Havertown, Lansdowne Borough, Marcus Hook, Media, Norwood/Prospect Park, Ridley Park, Wayne, Swarthmore, 69th Street		Ellis Preserve
Montgomery	King of Prussia/ Valley Forge	City Avenue, Fort Washington, Montgomeryville, Plymouth Meeting, Willow Grove/Horsham, Route 422/Collegeville		Ambler Borough, Ardmore, Bryn Mawr, Conshohocken, Glenside/Keswick, Hatboro Borough, Jenkintown, Lansdale, Narberth, Norristown, Pottstown, Spring City/ Royersford, Telford/Souderton	Tri-Borough	Kulpsville
Philadelphia	International Airport/Navy Yard/Sports Complex	City Avenue, Boulevard/ Grant/Woodhaven	Broad and Passyunk, Woodland Avenue, 52nd and Market, Broad and Cecil B. Moore, Broad and Erie, Kensington/Richmond, Manayunk, Roxborough, Germantown, Chestnut Hill, Mount Airy, Broad and Olney, West Oak Lane, Frankford, Bustleton and Cottman, Lawncrest/Fox Chase, Mayfair/Holmesburg			
Burlington	Cherry Hill/ Mount Laurel/ Marlton	Route 38/Mount Laurel		Bordentown, Burlington City, Mt. Holly, Palmyra, Pemberton Borough, Riverside Township, Village of Moorestown	Browns Mills	Columbus, Wrightstown
Camden	Camden, Cherry Hill/Mount Laurel/Marlton	Cherry Hill	Fairview, Parkside	Collingswood, Gloucester City, Haddonfield, Haddon Heights, Westmont		Voorhees/ Lindenwold
Gloucester		Deptford		Glassboro, Paulsboro, Pitman, Swedesboro, Woodbury		Woolwich
Mercer	Trenton, Route 1 Corridor		Chambersburg/Wilbur, North Trenton	Hightstown, Princeton Borough, Washington Town Center	Pennington Borough, Hopewell Borough	Mercer Crossings

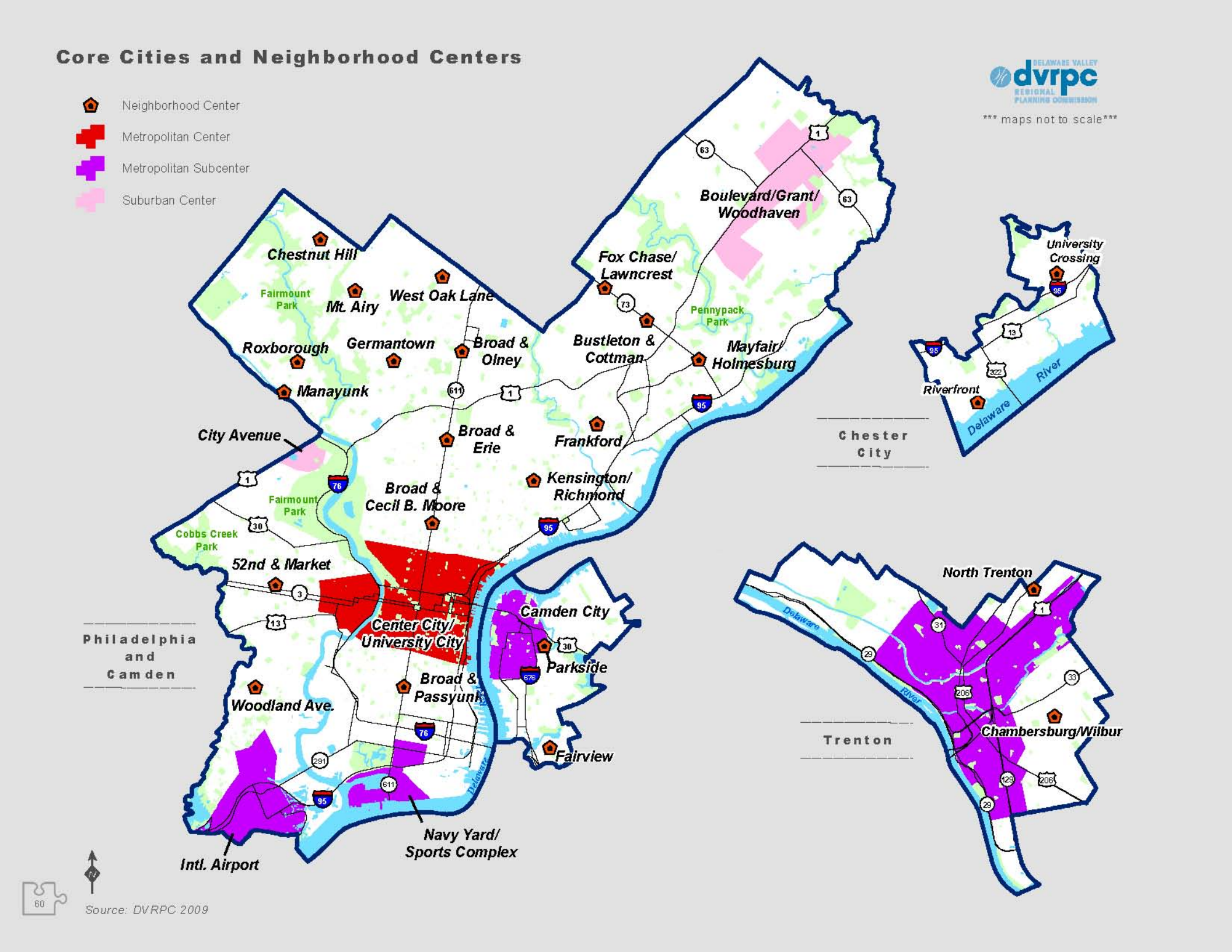
Source: DVRPC 2009

Planning Areas and Centers



Source: DVRPC 2009

Core Cities and Neighborhood Centers



Source: DVRPC 2009

Goal: Promote Affordable and Accessible Housing

Housing is an important facet in determining the livability of individual communities and the competitiveness of the region as a whole. A lack of affordable housing opportunities within a reasonable distance of the workplace affects the workers' quality of life and can have significant negative consequences on employers, including difficulty in attracting and maintaining a quality workforce; increased retraining costs; a need to pay disproportionately high wages; and increased tardiness and absenteeism, resulting in decreased employee productivity. Local economies may also suffer, as more and more of each family's disposable income is consumed by housing and/or transportation costs. Volunteerism becomes difficult, and time that otherwise might be spent participating in community activities is instead spent commuting to and from work.

First-time homebuyers in particular find it difficult to locate an affordable home for purchase, particularly in the neighborhoods where they grew up or close to their current place of employment. Limited opportunities for first-time homeownership can result in a tightening of the rental market, as families that would traditionally purchase their first home find it increasingly difficult to locate an affordable unit in an attractive location. Increased demand for a limited supply of rental units leads to increased rental costs, which in turn makes it even more difficult to accumulate the necessary capital for a down payment and closing costs.

Additionally, with the projected aging of the region's population over the next 26 years, more accessible housing units will be needed. The individual units themselves need to be built to allow for senior or handicapped accessibility, allowing for individuals to maintain the greatest independence possible. They also need to be woven into the fabric of existing and planned centers for social interaction, easy access to the transportation system, shops and restaurants, and other activities.

Federal and state past and current housing policies have generally encouraged suburban sprawl, disinvestment in cities and older communities, and a concentration of affordable housing in the region's core cities and first suburbs. In turn, a mismatch between the locations of jobs and labor has developed, with many lower-income and entry-level workers limited to affordable housing options located far from suburban job centers. This mismatch has resulted in increased commute times, spiraling transportation costs, and increased traffic congestion, which in turn contribute to decreased productivity and increased employee turnover.

The concentration of affordable housing in older communities also reduces the local tax base, impacting the local community's ability to finance a quality education system, invest in needed infrastructure repairs, and meet social service demands. As a result, older municipalities find it even more difficult to attract market-rate housing and middle-income residents, further

compounding the problem. The attractiveness of the region's older communities is reduced and development sprawls outward into the suburbs, continuing a downward cycle that reduces the region's overall competitiveness.

In response to the limited number of affordable housing opportunities in newer suburban communities, the New Jersey Supreme Court has established a constitutional obligation for every municipality to provide for a fair share of their region's affordable housing need, and the state's Municipal Land Use Law requires that all municipalities adopt a housing plan that addresses how they will meet that need. Pennsylvania's Municipalities Planning Code requires that every municipality provide for every type of housing, but does not address affordability. What is needed is a more balanced and sustainable approach to housing that will benefit older and newer communities, workers and employers, and the region as a whole. Tools available to help preserve the region's existing stock of affordable units or support the creation of new affordable housing opportunities in close proximity to employment and/or transit include the following:

- Expand programs that support the rehabilitation or modification of existing affordable units.
- Allow increased densities and an integration of land uses, particularly around employment centers and transit.
- Allow a full range of housing types in residential zones, including nontraditional housing alternatives, such as elder cottages and accessory apartments.
- Support the adaptive reuse of obsolete nonresidential buildings for residential uses.
- Offer density bonuses to developers willing to construct affordable housing.
- Undertake public-private partnership efforts.
- Reduce the cost of development by streamlining plan review and permitting processes.

Policies to Promote Affordable and Accessible Housing

- Preserve the region's existing affordable housing stock.
- Increase the stock of affordable housing units in suburban centers close to jobs and services and served by public transit.
- Increase employment in places where affordable housing opportunities currently exist, including the region's core cities and developed communities, by increasing their attractiveness to moderate- and middle-income families searching for affordable housing close to work and in places where they would want to live and raise their families.

Goal: Enhance Community Design

How our communities look and function is an important issue. Several studies have now shown that many Americans want to live in traditional towns, places where they can walk to the store and walk their kids to school. The National Association of Realtors found that over 60 percent of Americans want to live in such walkable, mixed-use communities. However, community design is not just about consumer choice. Communities that are designed for the pedestrian and connected to transit can enhance safety, mobility, economic competitiveness, quality of life, and cost of living. Consider this:

- Municipalities across the region are focusing on community design for their shopping districts, creating a more attractive and walkable environment in order to bolster economic growth.
- Designing places that are oriented to the pedestrian reduces reliance on automobile travel for everyone, while increasing mobility for the elderly, the young, and the disabled.
- By enhancing the visual perception of an area from a commuter corridor to a destination with people and activity, municipalities have calmed traffic and created safer, more attractive streets.

- By concentrating growth around existing centers while preserving farmland, we are saving costs on new roads and infrastructure and preserving our valuable open space.

In November 2007, DVRPC produced *Promoting Civic Design Excellence for Philadelphia*, a report that contends that investing in good design can make a place competitive, livable, and noteworthy. Communities in the DVRPC region that have invested in smart, walkable design have attracted good development and new residents. Places such as Ambler, Haddonfield, Collingswood, Media, Center City Philadelphia, and Narberth have reputations as desirable places to live and do business. DVRPC's program, Classic Towns of Greater Philadelphia, recognizes and promotes a number of the region's unique, diverse, livable communities.

Some of the keys to community design include concentrating new growth in existing centers, preserving open space, valuing the pedestrian, mixing residential and commercial uses, connecting with transit, historic preservation, infill development built up to the street line, parking on-street or hidden behind commercial structures, and investments in facades, landscaping, and streetscaping to create a high-quality public realm. Together, these elements can transform a place and develop a fresh identity.

The first challenge for many municipalities is making the shared decision that smart growth and enhanced community design are desirable goals. The second challenge is figuring out how to get there. DVRPC promotes a series of tools that, when combined, can help municipalities create better places for their residents, and businesses, and for the competitiveness of the region. These tools include:

- Form-based zoning;
- Design standards/guidelines;
- Development incentives;
- Multimunicipal planning/zoning;
- Special zoning districts;
- Transferable development rights;
- Investment in placemaking;
- Multimodal planning;
- "Green streets" and sustainable site design techniques; and
- Environmental resource inventories and resource protection ordinances.

Pennsylvania and New Jersey each have a number of assistance programs and funding sources to support the implementation of these tools. Through strategies like tax-increment financing, transit revitalization investment districts (TRID), business or neighborhood improvement districts, impact fees, and state investment programs, municipalities have resources to start planning for smarter and more competitive environments. Enhancing community design takes a fresh mindset and a commitment to public education.

Policies to Enhance Community Design

- Enhance the design quality of new development and redevelopment, such that it is more sensitive to its surroundings, community character, and thematic landscapes, through the implementation of municipal smart growth tools.
- New development should incorporate a mix of uses, new urbanism principles, pedestrian and bicycle friendliness, and, where appropriate, transit-oriented design.
- Promote and market the amenities and unique qualities that make the region's developed municipalities and neighborhoods great places to live, work, and play.

Goal: Promote Community Green Infrastructure

The term "Green Infrastructure" is being used more and more in the conservation, planning, and development fields, but it is a term that means different things to different people. Some people refer to green infrastructure as vegetated greenways due to the flood control and stormwater management functions that they perform. Others think of street trees along urban boulevards as green infrastructure due to the air quality, stormwater retention, and cooling benefits that they confer. Even engineered structures such as green roofs can be considered green infrastructure. A good definition of green infrastructure is "an interconnected network of greenspace that conserves natural ecosystem values and functions and provides associated benefits to human populations."[10] Whereas greenspace is often viewed as a nice amenity, attaching the term "infrastructure" to "green" implies something necessary to have. Protecting, restoring, and enhancing our region's natural life support system is a necessity, not an amenity.[11]

[10] Green Infrastructure: Smart Conservation for the 21st Century. Mark A. Benedict and Edward T. McMahon, The Conservation Fund. Sprawl Watch Clearinghouse Monograph Series. Washington, D.C. 2002.
[11] Ibid.

Photo by: Steve Hiltner

The *Connections* Plan proposes a Greenspace Network throughout the region that serves to protect and connect environmentally sensitive areas for ecosystem functions and people's connections to places. Drilling down to a finer scale, the *Connections* Plan also promotes installation and maintenance of green infrastructure throughout the region's urban, suburban, and rural communities. This "community green infrastructure" consists of small parks, trails, community gardens, street trees, green schoolyards, landscaping, and green roofs. Together, these various types of green infrastructure perform valuable ecosystem functions that the public would have to otherwise pay for, and they promote livability. For example, a recent study commissioned by the Philadelphia Parks Alliance and conducted by the Trust for Public Land documented the ecosystem value of parkland and trees in Philadelphia. The air pollution mitigation value was calculated at $1.5 million annually, and the stormwater management value

was calculated at $5.9 million annually. These are tremendous cost savings to the city government.

Few elements of the grey infrastructure of our developed communities can be said to boost property values, support retail activity, improve municipal health, protect water quality, reduce stormwater runoff, counter climate change, provide wildlife habitat, and ensure roadway safety–all at once. Communities need look no farther than their trees to enjoy this host of benefits. Many of these benefits of community trees have been quantified: recent studies from the University of Pennsylvania demonstrate that planting a tree within 50 feet of a house can increase its value by nine percent, and that cleaning and greening vacant lots can increase adjacent property values by as much as 30 percent.[12] Each year, a single large shade tree can absorb 90 pounds of carbon dioxide and 10 pounds of air pollution, including four pounds of ozone and three pounds of particulates.[13] Philadelphia's 2.1 million trees currently store approximately 530,000 tons of carbon, at an estimated value of $9.8 million.[14] One hundred mature tree crowns intercept approximately 100,000 gallons of rainfall per year.[15] Over its lifetime, a single street tree produces $90,000 of direct benefits, such as traffic calming safety, stormwater retention, and air quality improvements, and this does not include aesthetic, social, and other natural benefits.[16]

Despite all these benefits, loss of tree coverage is occurring almost everywhere across the region. To counter this trend, each county and municipality can do its part by setting tree canopy coverage goals and methods to achieve them. American Forests recommends the following generalized targets for different land uses, recognizing that every community is different and needs to set its own targets:

- 40 percent tree canopy overall;
- 50 percent canopy in suburban residential;
- 25 percent tree canopy in urban residential; and
- 15 percent tree canopy in central business districts.

Methods to achieve these goals include developing strategies to plant trees in suitable spaces, such as vacant lots, parks, and riparian areas, planting trees to absorb stormwater runoff, requiring trees in redevelopment and new development projects, and maintaining trees to prolong their life and environmental benefits. Communities can make use of a number of regulatory, planning, and nonregulatory tools, such as tree protection ordinances, tree inventories, and street tree commissions.

Converting existing streets into "green streets" is another way to install green infrastructure in a community. Green streets include features such as swales, pervious pavement, vegetated strips, medians with infiltration beds, street trees, and planted curb bump-outs. Benefits of green streets include reduction and management of stormwater through interception, evapotranspiration, throughfall, and attenuation. They improve water quality by filtering stormwater, removing contaminants, cooling runoff before it reaches a water body, and reducing the volume of water entering drainage systems, which is especially important with combined sewer systems. Added vegetation also makes streets more attractive for pedestrians, encouraging more use, which further increases safety.

Many schools, particularly in urban areas of the region, are surrounded by concrete and asphalt and provide no lawns or trees for recreation, shade, or relief from the surrounding urban environment. Yet schoolyards have great potential to become neighborhood parks. As parks with trees and natural landscaping, green schoolyards can filter air and water pollution, reduce stormwater runoff, increase property values, provide improved recreational opportunities and living laboratories for school curricula, promote human health, and increase community cohesion.

[12] The Determinants of Neighborhood Transformations in Philadelphia–Identification and Analysis: The New Kensington Pilot Study. The University of Pennsylvania. Philadelphia, PA. 2004.
[13] Planning and Managing Natural Resources: A Guide for Municipal Commissions. Bill Elmendorf. State College, PA. 2008.
[14] Assessing Urban Forest Effects and Values. USDA Forest Service. Northern Research Station. Resource Bulletin NRS-6. 2007.
[15] Ibid.
[16] Urban Street Trees. Glatting Jackson. Orlando, FL. 2006.

Green infrastructure can make communities more livable by turning areas like this:

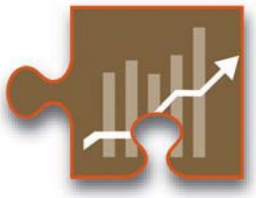
Into areas like this:

Source: GreenPlan Philadelphia, City of Philadelphia. Philadelphia, PA. July 2008 Draft.

Community gardens and urban agriculture can range from a rooftop garden to a for-profit business that grows crops for sale. Whatever the scale of the operation, growing food in developed communities is an important element of green infrastructure that provides multiple benefits. Benefits of farming or gardening lands in developed communities include watershed and water quality protection through the capture and absorption of rainwater, filtering of air pollutants, provision of habitat for native species and improved biodiversity, greater access to fresher, healthier foods, decreased cost and amount of energy consumed in transporting food, increased food security for food-insecure populations, job creation, participation in neighborhood revitalization, promotion of community cohesion, outdoor exercise, and educational opportunities.

Policies to Promote Community Green Infrastructure

- Promote the planting and stewardship of shade trees in suburban and urban areas to enhance property values, provide energy savings, store and sequester carbon, clean the air, and absorb stormwater.
- Incorporate elements of green streets when new streets are constructed and when existing streets are upgraded with improvements.
- Encourage school districts to undertake schoolyard greening initiatives by working with nonprofits, civic associations, parent-teacher associations, and their municipal governments.
- Support community gardens and urban agriculture by ensuring that it is a permissible use in zoning codes, promoting the conversion of vacant land to agriculture, providing financial incentives, and assisting in the formation of farmers' markets and "buy local" campaigns.
- Integrate green infrastructure such as trees, rain gardens, landscaping, parkland, trails, and green roofs into development and redevelopment projects to reap the multiple ecosystem, economic, and livability benefits that they provide.



Principle: Build an Energy-Efficient Economy

The region's economy is large, diverse, and multifaceted, with dozens of public and private economic development organizations, each seeking to promote or attract a wide variety of sectors or specific interests. Thus, there is no single process or simple strategy that will fully address all of the opportunities and challenges that the region faces. Continued coordination across state lines, across city and county lines, across sectoral interests, and across the public and private sectors is essential to maintain that broad view of the region and find a common vision, goals, and objectives.

The *Connections* Plan reiterates the policies and strategies embodied in the Commonwealth of Pennsylvania's Keystone Principles for Growth, Investment, and Resource Conservation. The Keystone Principles state general goals and objectives for economic development and resource conservation, and were agreed upon among 23 state agencies as a coordinated interagency approach to fostering sustainable development. The Plan is also consistent with the economic growth strategies touted by New Jersey's Office of Economic Growth.

A fundamental component of future economic growth for any region is to identify key growth sectors, particularly sectors that match a region's strengths and workforce. Greater Philadelphia is already home to a high concentration of such cutting-edge sectors as life sciences, chemicals, and higher education. There is also a burgeoning alternative and clean energy industry in the region. Furthermore, this sector is poised for high growth during the coming years. Developing a "green" economy means not just focusing on high-paying technical positions, but also more blue-collar "green jobs." The term "green jobs" is used by some observers to describe those jobs and occupations associated with environmental improvement, energy conservation, and renewable energy. These workers bring expertise and knowledge of environmentally conscious techniques in design, policy, conservation, and sustainability into the economy. With more stringent environmental regulations and energy concerns, many companies now seek professionals with knowledge of environmental and energy issues. These workers encompass professions such as environmental consultants, environmental or biological engineers, green architects, environmental lawyers, educators, and technology workers. This category of jobs also includes low-skill jobs, such as insulation installers

Building an energy-efficient economy will:

- Create a steady supply of sustainable jobs in emerging, high-growth industries.
- Provide new green collar jobs for those currently underemployed.
- Reduce airborne pollutants to acceptable levels.
- Save residents on household energy and transportation costs.
- Save local governments in reduced energy expenditures

and recycling workers, which provide employment opportunities for low-skilled workers.

The Greater Philadelphia region has made an excellent start in establishing itself as a center for businesses and professionals who possess the skills to transform challenges in energy efficiency and ecological sustainability into a competitive economic advantage, creating jobs and quality economic development for our region. DVRPC is actively engaged in regional efforts to foster this growth and the jobs that attract and retain skilled professionals, and to link the economy's need for blue-collar workers trained to perform jobs related to energy conservation and environmental improvement with the need for a ladder out of poverty for jobless urban residents.

As discussed in DVRPC's 2006 publication *A Post-Global Economic Development Strategy*, global challenges present local opportunities to redirect regional economic development efforts to prepare the region to compete in a future where energy-efficient and environmentally benign products and services will be key drivers of growth.

Goal: Support and Promote the Growth of Key Economic Sectors

Like many urban areas, the Greater Philadelphia region's economy has undergone a major transition in recent decades. Roughly a half-century ago, manufacturing dominated the economy of both the city and the suburbs, providing almost half of the city's jobs and 58 percent of those in the region. As manufacturing employment has declined to its current share of 7.5 percent of total nonfarm employment in the region, knowledge-based industries have gained prominence, with life sciences, information technology, professional services, and chemicals ranking among the region's top industries. Sectors such as education and health services, professional and business services, financial activities, and information technology have emerged strongly as principal drivers of the economy.

The largest employers in the Greater Philadelphia region are health and educational institutions. A recent survey conducted by Select Greater Philadelphia found that half of the top 10 private employers in the region (including three of the top five) were either health or educational institutions, and that these institutions accounted for 58 percent of the total jobs among the top 10 private employers. A 2007 study, conducted by Select Greater Philadelphia, found that higher education institutions and their associated health systems have a direct spending impact of more than $12.3 billion annually into the region's economy. In sum, the higher education system accounts for more than 85,000 direct jobs and 125,000 indirect and induced jobs. Though health and educational institutions are often seen as local economic engines, they also play an export role by attracting spending, investment, and a highly educated workforce into the region.

The region must continue to attract new companies in key, high-paying economic sectors, including those related to the emerging "green economy," that have the greatest potential for growth and encourage the expansion of existing companies that compete in these sectors, which include:

- Life sciences (biotechnology and pharmaceuticals);
- Alternative/clean energy and energy conservation;
- Tourism;
- Health care;
- Higher education;
- Finance and investments;
- Professional and business services;
- Creative industries;
- Information technology;
- Chemicals;
- Defense and homeland security;
- Internet, cable, and telecommunications;
- Transportation and logistics;

- Specialty manufacturing; and
- Food production, processing, and distribution.

The Greater Philadelphia region's connections to the global economy are essential to maintaining the region's economic competitiveness in an interconnected world. The region needs to promote international trade and continue to attract foreign direct investment. Success requires expanded capacity and improved performance at Philadelphia International Airport, as well as enhanced utilization of the region's ports and overall leverage of the region's multimodal infrastructure. With limited available funding for improvements to the transportation network, facilities that serve clusters of key economic sectors should receive priority attention.

Improving the region's pre-K to 12 public education, especially in the urban districts, is a critical task. There is also a tremendous opportunity to leverage the region's impressive higher education resources to raise the level of educational attainment. In addition, there are opportunities to help develop skills through industry and school partnerships and specialized training that offer pathways into specific careers, such as biotechnicians or energy auditors. This is especially pertinent to lifelong learning programs to (re)train adults, seniors, and immigrants as they (re)enter the work force. There is also a need to better connect small employers with the resources available through the public workforce system and others involved in workforce training.

Employment that matches the skills of the workforce that the region currently has and has committed to developing should be supported and promoted. Jobs appropriate for employing and building on the skills of the region's most vulnerable and distressed populations, including those who have been chronically unemployed, must also be created. These jobs should foster pathways out of poverty through career ladders.

Policies to Support and Promote Key Economic Sectors

- Prioritize transportation investments that serve key economic sectors.

- Foster a high-quality, productive labor force.
- Enhance the climate for business growth.

  Specific recommendations include:
  - Seek and welcome business locations and expansions;
  - Expand availability of venture and other investment capital;

- Continue to secure a more attractive business tax environment;
- Increase the speed, predictability, and transparency of government decision-making;
- Foster regional collaboration;
- Improve the region's image both internally and externally;
- Conduct a regional economic development marketing program;
- Engage business leaders in growing the regional economy;
- Promote entrepreneurship to increase the rate of new business formation, both within the region by residents and by attracting entrepreneurs from other regions; and
- Retain and improve the region's quality of life to ensure that Greater Philadelphia remains an attractive place to live and work.

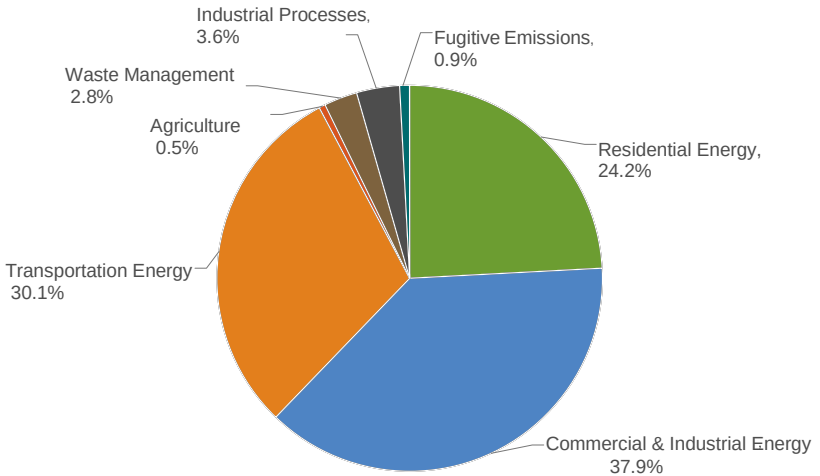
Goal: Reduce Greenhouse Gas Emissions

Rising levels of greenhouse gases (GHG) pose an impending threat to the world's economy. As nations begin to more closely monitor and regulate GHG emissions, their ability to compete in the world marketplace will also be impacted. DVRPC's *Regional Greenhouse Gas Emissions Inventory* estimates that in 2005, the region produced just over 90 million metric tons CO_2 equivalent of GHGs. This was roughly 1.5 percent of the U.S. total, about the same as Portugal and more than Austria, both of which have populations about two times that of the DVRPC region.

Over 90 percent of these emissions are from stationary or mobile energy consumption. The latest science indicates that a reduction in GHG emissions of 80 percent is required by 2050 to keep global climate change within an acceptable range. A 50 percent reduction by 2035 would put our region on track to achieve this goal.

Even if there were no GHG concerns, the impact of energy prices on our economy is tremendous. Total expenditure in the region for energy (electricity, natural gas, gasoline, diesel, heating oil, coal, and jet fuel) in 2005 is estimated at $15 billion, or about five percent of the region's $300 billion economy. If the same amount of energy were consumed at the energy prices of mid-2008, it would cost $25 billion. While we cannot predict future energy prices, most observers agree that they will increase over the long term. At twice the prices of mid-2008, the region's 2005 energy consumption would cost $50 billion, or about one out of every six dollars in the region's economy. As energy prices increase, more of our regional economy is eaten up by energy, leaving fewer resources available to address other regional needs.

Emissions by Source



Source: DVRPC 2008

Regional land and housing development patterns over the coming decades will have a profound impact on future energy requirements as well. Shown on the following page are GHG emissions per capita (including both population plus employment) by municipality. Population plus employment serves as a good indicator of overall economic activity. As the map

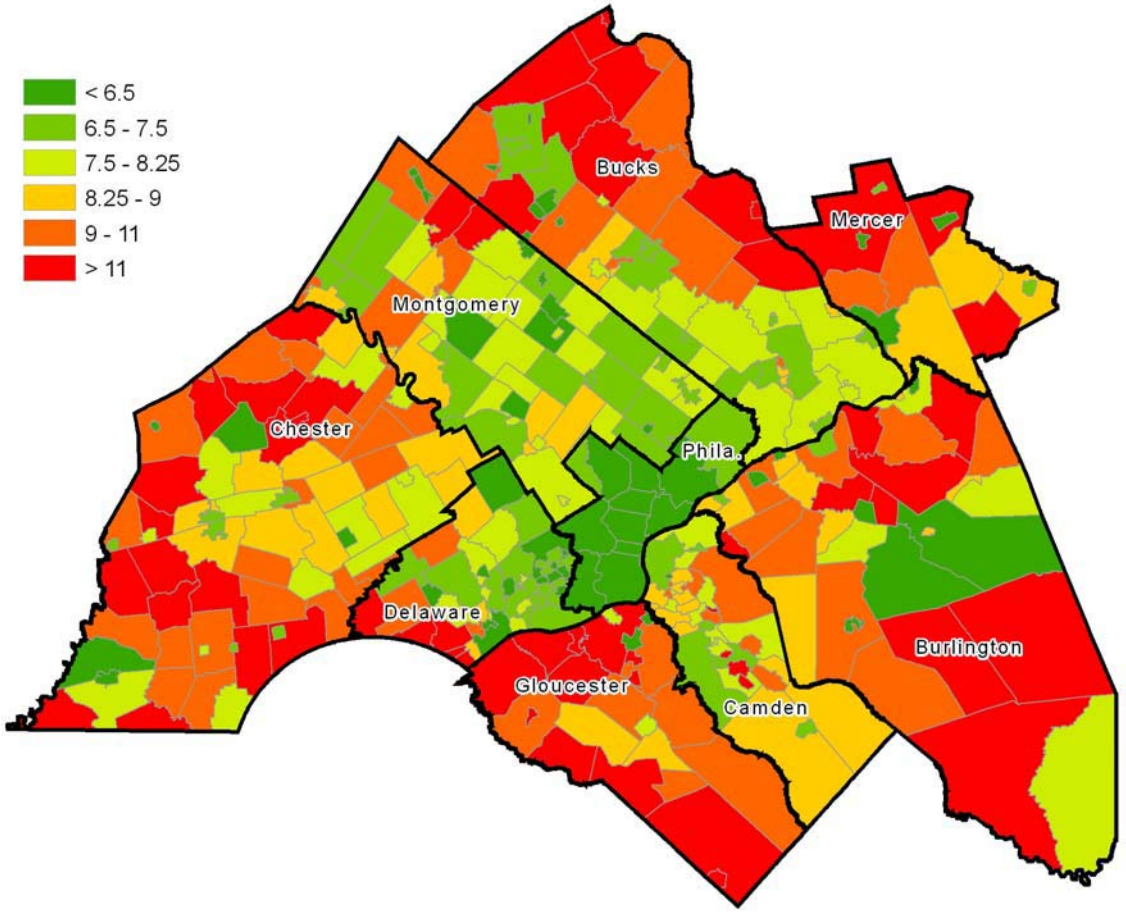
illustrates, municipalities with higher levels of activity per acre produce lower emissions per person.

In general, emissions per capita are lower in those municipalities that encourage walkable, mixed-use neighborhoods, are near transit infrastructure, have smaller houses, and require less driving. DVRPC's transportation and land use planning policies and projects work to advance these goals.

Similarly, building codes and regional programs that result in new high-performance buildings and the retrofitting of existing buildings will further reduce our region's energy requirements. DVRPC continues to bring to the region's planners the latest tools and knowledge for green codes and zoning, and to incorporate sustainability elements into comprehensive plans. The GHG illustration is a reasonable proxy for how much energy is used per capita in different municipalities in the region. As energy becomes more expensive, it is likely that municipalities with lower energy consumption per capita will be more desirable places to live and locate businesses.

Over the coming decades, the profound transformation of the global economy to use less energy and produce less GHG presents a tremendous opportunity for Greater

2005 Greenhouse Gas Emissions per Population Plus Employment by Municipality (in $MTCO_2E$)



This allocation excludes the following sources: industrial energy consumption, highway through traffic, aviation, marine vessels, off-road vehicles, livestock, cement, and iron/steel production.

Source: DVRPC 2009

Philadelphia. As we transform our land use to build on our historic advantages of mixed-use development and transit infrastructure, we will also transform our business and workforce infrastructure to provide the products, services, and skills required for this future. This transformation will require regional cooperation and strong coordination between the states, counties, and municipalities. DVRPC continues to play a critical role in building and leading that coordination.

As energy prices increase and governmental policies to curb GHG emissions are put in place across the nation and world, businesses and individuals will increasingly select places where they can meet their needs with less energy from fossil fuel sources. In order to keep the DVRPC region competitive, a multipronged strategy is needed to effectively address both GHG emissions and energy use.

Policies to Reduce Greenhouse Gas Emissions

- Reduce GHG emissions by 50 percent by 2035 compared to 2005 levels.
  - Provide services with less energy by encouraging the use of more efficient cars, furnaces, and lighting, and expand transit services.
  - Produce energy with less CO_2 by promoting biofuels, solar hot water and electricity, wind power, geothermal energy, and nuclear power as alternatives to carbon-based fuels.
  - Reduce the demand for services and energy provision by locating jobs, housing, and services closer together and encouraging denser development.

Principle: Establish a Modern, Multimodal Transportation System

Transportation planning supports the region's land use, environmental, and economic development policies. In this context, DVRPC is committed to the regionwide promotion and implementation of a safe, convenient, and seamless passenger and freight multimodal transportation system that includes air, water, road, rail, bus, bicyclist, and pedestrian networks of mobility. This is accomplished in a collaborative manner with a wide range of stakeholders and is based upon strong technical analysis.

Transportation networks have been a key component of prosperous regions throughout history, and the efficient movement of people and goods locally, regionally, and internationally will be a hallmark of thriving regions in the future. Greater Philadelphia enjoys a superb advantage by virtue of its location in the middle of the Northeast Corridor, but needs to address several challenges to continue to take advantage of this locational benefit in the future. Maintaining and improving key interstate and interregional highway and transit routes is imperative, as is upgrading the region's airport and port facilities, which serve as our links to the rest of the world.

Traffic congestion in our region consumes an average of 38 hours per traveler per year–the equivalent of a week's vacation–and costs the region over $2.3 billion annually in lost productivity costs.[17] Smart investments in transportation save time and money, improve the environment, and enhance the region's economy. Transit is a key component to reduce congestion, and the region enjoys a robust transit system that most areas of the country cannot rival. However, due to the sprawling development patterns of the past 50 years, the suburban areas do not have enough density to support transit, and many portions of the urban system are underutilized.

The road and transit systems are mature, and both require extensive investment to bring them up to a state of good repair, and even more to maintain them into the future. Many parts of the transit system are a century old, and most of the region's freeway network is over 50 years old. Funding for bridges presents a particularly significant dilemma. Currently, the region can only fund about half of the identified needs for bridges over the life of the Plan. The collapse of the I-35W Bridge in Minneapolis and

[17] 2009 Urban Mobility Report, Texas Transportation Institute, July 2009.

Establishing a modern, multimodal transportation system will:

- Allow for greater mobility of people, products, and services.
- Save drivers in vehicle maintenance costs.
- Provide safer conditions for all modes.
- Reduce automobile congestion, dependence, and associated pollution.
- Preserve open space and natural resources that would be lost by the construction of new roads.
- Improve air quality by reducing emissions.
- Generate added revenue via freight distribution channels and increased productivity.
- Create new jobs by attracting businesses that benefit from a high-performing transit system, educated workforce, and centralized location.

DVRPC's Transportation Planning Philosophy

- Transportation investments will support the goals and policies of the DVRPC Long-Range Plan.
- The priorities for transportation projects and programs are as follow:

1). Maintain, optimize, and modernize the existing transportation system and rights-of-way. This includes optimizing the services delivered by the system, such as options for and convenience of transfers among modes.

2). Manage demand for transportation by fostering land use patterns and other strategies that reduce the need for and length of trips.

3). Increase the capacity of the existing multimodal transportation system, limiting the addition of through travel lanes.

- The transportation planning process will be comprehensive, cooperative, continuing, compatible, and coordinated. The first three are the basis of the federally required "3C" process. This process will be:
  - **Comprehensive** – All modes and their implications will be considered and evaluated. All transportation solutions will consider more than one mode.
  - **Cooperative** – Work together productively, seeking consensus and enhancing participation across the whole population.
  - **Continuing** – New endeavors need to incorporate maintenance, consider prior efforts, and fit with adopted ongoing system planning efforts.
  - **Coordinated** – This complex region requires a focus on fitting pieces and projects together across agencies, organizations, and boundaries.
  - **Compatible** – Try to make land uses and infrastructure (transportation, water/sewer, and technologies) work efficiently together.
- Investment benefits and costs should be strategically distributed across the region, with careful consideration of environmental and social impacts. Investments will be affordable and consider appropriate economic development. Projects will incorporate context-sensitive design and other smart transportation techniques.
- The region will be innovative at incorporating policy approaches, ITS applications, and emerging technologies. DVRPC will be bold in doing projects that continue to transform the region into a better place to live, visit, and work.

recent emergency shutdowns to I-95 in this region because of cracks in the bridge supports highlight the danger and economic consequences of not investing in the infrastructure. The sheer amount of maintenance needs in the region means that funding for improving and expanding our system must be diverted to rebuilding the existing system.

Within the current constrained fiscal environment, we must continue to find ways to ensure safety and security of the system, reduce congestion, and improve the ability of all people to reach destinations throughout the region. Automobiles and trucks also contribute significantly to the region's GHG emissions, air pollution, stormwater run-off, and other environmental impacts. The planning process must additionally consider the significant environmental impacts that the transportation system, particularly the highway network, has on our natural environment. The *Connections* Plan calls for a more sustainable approach that addresses land development and environmental impacts of the transportation system.

Looking toward the future, the *Connections* Plan envisions a seamless multimodal passenger and freight system that is safe; convenient; sufficient in its capacity; attractive and affordable to its users; accessible and equitable for all citizens and visitors to locations throughout the region; and incorporates sound growth management, urban revitalization, and environmental and economic competitiveness planning principles.

The *Connections* Plan contains a number of goals to achieve this vision. Because of the Plan's emphasis on intermodal transportation, separate sections are included for highways, transit, bicycle and pedestrian, freight, and aviation, as well as transportation operations.

Goal: Rebuild and Maintain the Region's Transportation Infrastructure

The age and sheer size of the region's transportation network, coupled with decades of deferred maintenance as system expansion took precedence, has led to a vast backlog of maintenance and repair needs. A high percentage of our roads, bridges, and rail infrastructure are rated as either deficient or obsolete. The rebuilding of the existing network of roads, transit lines, and other transportation facilities is the focus for transportation investments moving forward. We must continue to prioritize projects based on quantitative data to ensure that funds are spent efficiently and effectively. We must also plan for the future and preserve vital right-of-ways so that the system can expand. Utilizing abandoned rail lines as bike paths in the interim is one way in which key corridors can be preserved for future use.

Policies to Rebuild and Maintain the Region's Transportation Infrastructure

- Develop and employ asset-management systems to select cost-effective capital projects.
- Devote sufficient resources to address reconstruction and maintenance needs.
- Preserve existing rail and road right-of-way for future transportation uses.

Goal: Ensure Adequate Funding

The region faces many challenges in fully funding the current and future needs of the transportation system. The first step is to make sure that identified projects utilize smart transportation principles. Projects should be tailored to the size of the problem, respect the character of the community, take into account alternative modes, and be planned in collaboration with the community. This process ensures that we are getting the most out of our current funding levels.

Additional sources of revenue also need to be identified. Many of the possible sources will require federal approval or state enabling legislation to pursue. Funding mechanisms that spread out the cost over the entire region should be considered for projects that significantly impact regional travel and provide a regional benefit.

Policies to Ensure Adequate Funding

- Scale the solution of the size of the problem and tailor the approach to the specific project.
- Maximize the amount of state and federal transportation resources that flow to this region, consistent with statewide mobility needs and cognizant of the added costs associated with construction in dense, older urban areas.
- Establish a funding mechanism for financing projects of regional significance, including enactment of state enabling legislation to permit dedicated regional revenue generation.

Goal: Ensure Transportation Investments Support Long-Range Plan Goals

Transportation projects should support the four key Plan principles of managing growth and protecting resources; creating livable communities; building an energy-efficient economy; and of course, establishing a modern, multimodal transportation system. In particular, investments should serve areas that are either already developed or designated as appropriate for future growth, encourage (re)investment in the region's centers, have limited environmental impact, and support key economic sectors. Potential projects should be evaluated to make sure that they help achieve the key principles outlined in the Plan.

Policies to Ensure Transportation Investments Support Long-Range Plan Goals

- Apply context-sensitive design standards to transportation facilities.

- Promote transit-oriented development and mixed-use development.
- Encourage investment in older, developed areas and brownfields.
- Increase the level of investment in transportation facilities that promote freight movement and economic development.
- Limit new capacity to appropriate areas as identified in the Congestion Management Process.
- Consider the land use impacts of transportation investments in the development of plans and programs.
- Select projects for capital programming in the Transportation Improvement Program based on sound long-range strategic planning considerations, life-cycle investment analyses, and system performance and condition data (actual and projected).

Goal: Create a Safer Transportation System

The region's Regional Safety Action Plan focuses on reducing crashes and fatalities on the regional roadway system by providing a roadmap for effective collaboration and coordination among safety professionals and stakeholders. Strategies for advancing this goal are detailed in agreed-upon priority emphasis areas, which focus on various safety issues including: teen driver safety, impaired driving, roadway departure crashes, and seatbelt use. The Regional Safety Action Plan is a data-driven living document that is coordinated with New Jersey's and Pennsylvania's safety plans.

Policies to Create a Safer Transportation System

- Improve the safety of all users of all modes.
  - Plan for and seek funding for improvements to transportation infrastructure to increase safety.
  - Focus on key emphasis areas derived from analysis and coordination with other agencies as an efficient way to improve safety.
  - Support appropriate enforcement to improve safety, including building knowledge for necessary legislative initiatives, supporting relevant professional development for law enforcement staff, and educating members of the judicial branch of the consequences of frequently reducing charges.
  - Maintain a crash database and provide safety analysis to planning partners.
  - Facilitate coordinated emergency responses through incident management planning and other means of saving lives.
  - Promote and coordinate programs that educate about and market safety.
  - Address safety needs of environmental justice population segments, including elderly or disabled people.

Goal: Create a More Secure Transportation System

The federal transportation legislation, SAFETEA-LU, increased the national focus on security and established a larger role for metropolitan planning organizations (MPOs) in this area. One goal of this effort is to explore ways that MPOs can play a part in security planning by researching and documenting all ongoing security efforts among our traditional partners. DVRPC seeks to fulfill its classic role of facilitating the exchange of ideas and resource sharing to build upon existing programs to further security efforts in the region.

Policies to Create a More Secure Transportation System

- Elevate security in the planning process. DVRPC will consider and advance transportation security planning without compromising security-improving efforts by:
  - Consider regional transportation security in programs and projects, and in preparing capital programs.
  - Provide studies, analysis, and mapping as helpful to improve transportation security planning.
  - Support the development of efficient, coordinated responses–for example, through incident management task forces.

- Support the development and communication of regional preparedness and evacuation planning.
- Facilitate discussion among entities doing transportation security planning throughout the region and with related professions.
- Coordinate and cooperate with other bodies involved in transportation security planning with full respect for the extensive work already underway.
- Participate in regional recovery efforts, such as through capital programming changes in the event of a major incident.
- Aid the region in learning from major events–for example, by facilitating or participating in follow-up meetings.

Goal: Increase Mobility and Accessibility

Mobility refers to the movement of people and goods and accessibility refers to the ability to reach desired destinations within the region. Mobility is heightened when the transportation system is multimodal and provides connections between various modes. The ability to reach destinations throughout the region is a challenge for many members of society who do not have access to an automobile. There is a critical spatial mismatch between employment centers offering entry-level service sector jobs–which are predominantly located in growing suburbs–and workers who primarily reside in the region's inner cities and older suburbs. Providing alternative modes is crucial so that everyone in the region can enjoy mobility.

Policies to Increase Mobility and Accessibility

- Promote coordination and integration of all transportation systems.
  - Establish opportunities for connections among all modes.
  - Improve scheduling and operations to accommodate intermodal movements.
  - Provide system accessibility for all segments of the population and increase affordable transportation alternatives.
  - Comply with regulations and guidance for the Americans with Disabilities Act and Title VI.

Goal: Reduce Congestion

Congestion has a significant impact on a region's economic competitiveness since people and goods sitting in traffic equates to money lost in time. The Greater Philadelphia region experiences 112 million hours of travel delay annually, which ranks 11th nationally. This equates to over 71 million gallons of excess fuel consumed and an annual cost of more than $2.3 billion due to sitting in congestion.[18] Reducing congestion has traditionally been accomplished by expanding capacity. However, new capacity quickly fills up and entices expanded development ever further out. Other strategies, such as making the transportation system more efficient, instituting transportation demand management strategies, and providing alternatives to the single-occupant vehicle can also accomplish the same goal.

Policies to Reduce Congestion

- Optimize the efficiency of the existing transportation system.
  - Reduce traffic congestion along travel corridors and at critical intersections through incident management, access control, signal system improvements, and needed highway improvements.
- Reduce the amount of vehicle miles traveled, particularly single-occupant vehicle (SOV) trips.
  - Establish programs to reduce the number of vehicle trips.
  - Encourage practices that spread travel throughout the day and throughout the week, making the transportation system more efficient.
  - Provide more options for commuters.
  - Improve area coverage and operation of transit service.
  - Increase the number of multimodal transportation centers and park-and-ride facilities.
  - Improve bicycle and pedestrian facilities.
  - Focus construction of new capacity on missing links.

[18] 2009 Urban Mobility Report. Texas Transportation Institute. College Station, TX. 2009.

Goal: Limit Transportation Impacts on the Natural Environment

Transportation facilities have a significant impact on the natural environment. Automobiles, in particular, contribute significantly to air and noise pollution, and stormwater run-off from roads impacts water quality. DVRPC is committed to limiting the negative impacts of all transportation projects. DVRPC is devoting time and effort to a new approach that will better link environmental planning, transportation project development, and the National Environmental Policy Act (NEPA) process. NEPA establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment, and it provides a process for implementing these goals within the federal agencies. Its most significant impact is to require all federal government agencies to prepare Environmental Assessments and Environmental Impact Statements, which must contain statements of the environmental effects of proposed federal agency actions. Consideration of potential conflicts between transportation proposals and green infrastructure goals can simplify the NEPA process by identifying transportation solutions that avoid or minimize environmental impacts early in the planning process. DVRPC is considering the impacts of transportation projects on the region's ecosystems as a whole, including regulated and unregulated environmental features and ecosystem services. Conducting this screening and analysis aids in the identification of potential primary and secondary ecosystem impacts, encourages the development of projects that are compatible with regional environmental goals, and is a critical first step in the NEPA and permitting process.

Policies to Limit Transportation Impacts on the Natural Environment

- Encourage the reduction in use of travel modes that contribute significantly to air pollution by promoting the use of public transit, bicycle and pedestrian facilities, telecommuting, ridesharing, and car sharing.
- Improve the regional green infrastructure by refining and expanding the range of environmental mitigation activities.
  - Work with stakeholders to increase regulatory flexibility.
  - Promote ecosystem-based approaches to mitigation by increasing understanding of the importance and scope of green infrastructure.
  - Encourage activities that mitigate for impacts to unregulated environmental resources.
  - Assist stakeholders with the identification of mitigation sites.
- Encourage the use of more fuel-efficient, or alternative fuel, vehicles.

These goals transcend all transportation modes. However, each mode is unique, and the *Connections* Plan highlights different policy perspectives that are unique to each mode. The next section details a regional approach to transportation operations and is followed by specific perspectives and policies for highway, transit, freight, and aviation modes. Each of the sections was developed in collaboration with the respective DVRPC committee, which is comprised of operators and specialists in each of the fields.

Transportation Operations

Approximately 60 percent of the traffic congestion in major urban areas like Greater Philadelphia is due to temporary or nonrecurring conditions, such as disabled vehicles, traffic crashes, maintenance and construction activity, or adverse weather conditions. Traditional transportation improvement strategies, such as increasing highway capacity or providing alternative transportation options, are not applicable in these situations. Transportation operation strategies are targeted to mitigate nonrecurring congestion. Transportation operations are the application of a combination of technology, robust planning, improved preparedness, and extensive interagency and intra-agency coordination.

Benefits of transportation operations programs have been widely documented. For example, deploying emergency service patrols on expressways has reduced the average duration of incidents by 33 to 60 percent, resulting in fewer secondary accidents and saving millions of

gallons of fuel. Improving traffic signal timings by synchronization reduces travel times and delays by five to 20 percent, translating into a 10 to 25 percent reduction in fuel consumption. Using Automatic Vehicle Location (AVL) systems on buses has improved on-time bus performance by 12 to 23 percent, thereby reducing passenger waits at bus stops.

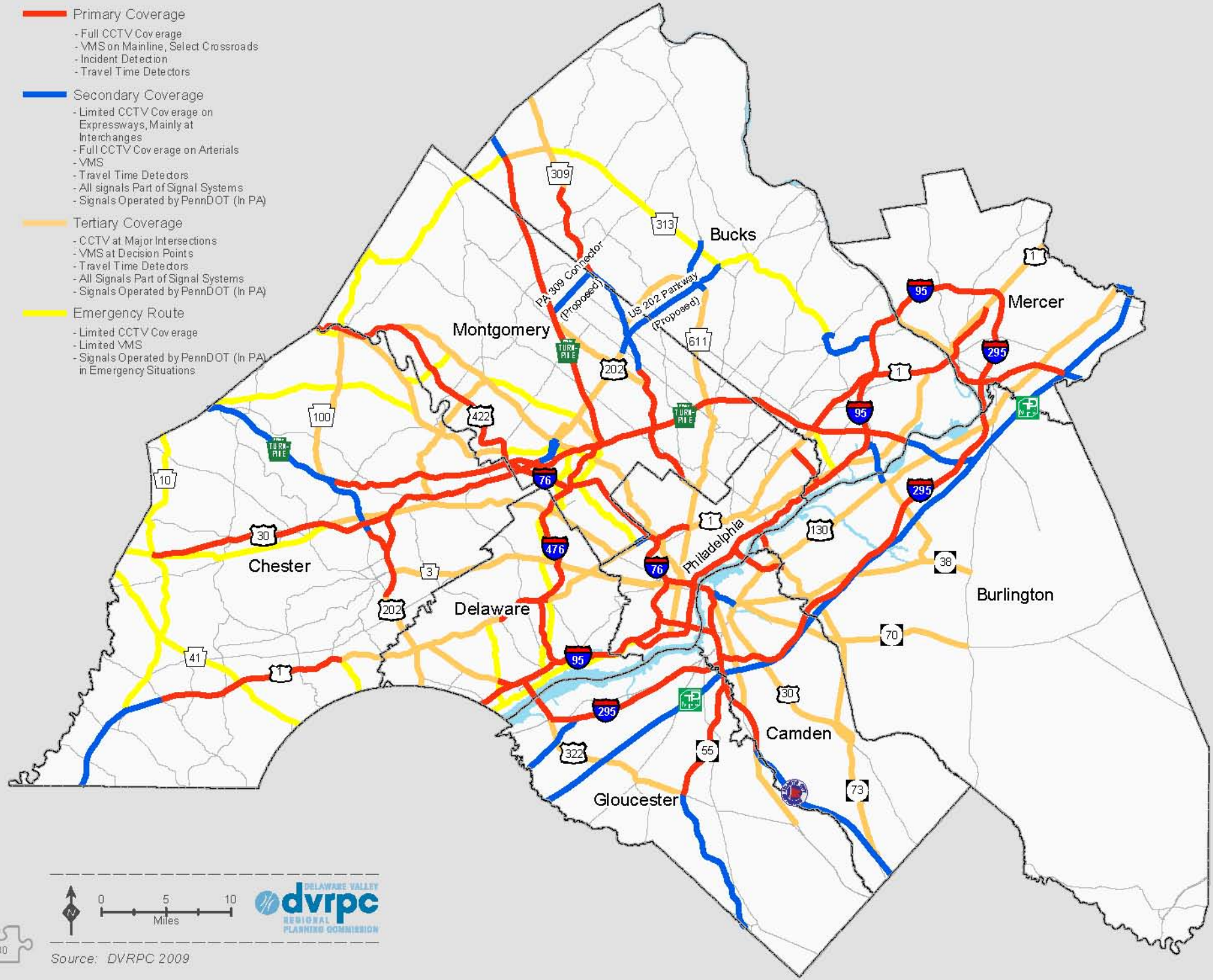
The *Transportation Operations Master Plan* was developed in cooperation with DVRPC's Transportation Operations Task Force (TOTF), which is composed of traffic, transit, and emergency management operators in the region. The *Transportation Operations Master Plan* contains four major operational policies associated with transportation operations management: incident management, traffic management, transit operations, and traveler information. Several basic tenets cut across them: the need to obtain real-time accurate information; the ability to share information among agencies and with the public; and having the appropriate resources available to respond to situations.

- Reduce traffic congestion through improved incident management.

  Twenty-five percent of traffic congestion in large urban areas is due to traffic incidents ranging from flat tires to overturned tractor-trailers. These unforeseen events cause havoc, making commuters late, affecting truck deliveries, and ultimately making the region less competitive economically. Incidents cause secondary accidents, where drivers slam into the rear of an unanticipated queue; the secondary crash can occasionally be worse than the original incident. Incident management strategies include:
  - Improve incident detection and verification,
  - Improve response times,
  - Improve interagency coordination and cooperation, and
  - Improve incident clearance.
- Reduce traffic congestion through improved traffic management.

  Improved traffic management targets both recurring and nonrecurring congestion. The objective is to move away from a static transportation system to a more dynamic transportation system. Examples include periodically retiming isolated traffic signals, installing more signal systems that can be centrally controlled to reflect current conditions, utilizing ramp metering and variable speed limit signs to manage traffic flow on expressways, and implementing more advanced work zone traffic control measures. Another strategy is to focus on travel corridors, instead of exclusively on expressways, using traveler information to help balance traffic over multiple roadways. Traffic management strategies include:
  - Implement integrated corridor management,
  - Optimize traffic signal operations,
  - Improve work zone management,
  - Implement traffic control programs, and
  - Improve winter weather management.

2035 ITS Infrastructure Vision



Source: DVRPC 2009

- Provide more options for travelers by providing real-time information.

  Providing travelers with real-time travel times, incident information, and transit delay information will give them a unique opportunity to optimize their trips. With information about travel conditions, they can make intelligent decisions about routes or modes, and take in-trip corrective actions to avoid delays. With cell phones and wireless technology, the public expects information on demand. Traveler information strategies include:

  - Collect travel condition information,
  - Promote public-private partnerships to disseminate traveler information,
  - Enhance agency traveler information programs, and
  - Enhance enroute traveler information.

- Improve delivery of transit services.

  Unlike highway agencies, transit agencies routinely perform transportation operations on an ongoing basis. They manage transit fleets and take corrective actions when vehicles breakdown or are delayed. Instead of primarily focusing on the operations side of transit, the main emphasis for transit will be the technology component. For years, transit agencies used technology to manage their rail systems, controlling signals and power systems. Modern Supervisory Control and Data Acquisition (SCADA) systems give operations center staff a more comprehensive picture of all elements of rail systems, automatically monitoring various system elements and issuing alerts when problems are detected. Installing on-board sensors in rail vehicles and buses complements SCADA systems and will lead to improved vehicle diagnostics, reducing the incidence of breakdowns and equipment failures. Computer aided dispatch (CAD) systems are used to monitor bus movements, identifying when buses are behind schedule and alerting operations center personnel that corrective action needs to be taken. Surveillance and traveler information systems similar to those used for highways can make transit stations safer and impart real-time traveler information to passengers. Transit management strategies include:

  - Implement technologies to control and operate transit systems,
  - Upgrade transit information systems,
  - Improve fare collection, and
  - Improve security and passenger safety.

The Transportation ITS Infrastructure Vision Map establishes different levels of ITS infrastructure deployment for various ITS elements, including CCTV cameras, variable message signs, incident detection, travel time detectors, and traffic signals. Level of coverage is associated with the location and function of the road. For example, different deployment levels are established for urban versus more rural expressways, and for major arterials that carry substantial traffic versus secondary arterials that support emergency operations.

Transportation Modes

Highway

Beginning with the creation of the Interstate Highway System in the 1950s, the national vision for transportation has been to build more and more roads. With the Interstate Highway System essentially complete, the emphasis now and in the future has shifted to making the roads that we have perform better. Greater Philadelphia is a mature region, with established settlement patterns and stable population and employment. There is not a need to expand the system as in other areas of the country with exploding population and employment. Secondly, there is a widely acknowledged realization that it is impossible to build your way “out of congestion.” New roads simply push development further out and new roads quickly fill up with traffic. The development patterns lead to sprawl and inefficient use of the region’s natural and man-made resources. Finally, the mounting maintenance need of the highway network requires more investment than can be readily met. It makes little sense to invest in new roads when we cannot maintain the roads

that we already have. A hierarchy of priorities for the roadway infrastructure follows.

1). Rebuild the Region's Infrastructure

Many of the region's freeways were built decades ago and require a massive amount of investment. In addition, many miles of county and locally owned roads have even greater funding deficits. Many recent examples, such as the Minnesota bridge collapse and the closing of I-95 in Philadelphia due to infrastructure failure, highlight the importance of reinvesting in the transportation system. Prioritization of maintenance projects should be based on a quantitative analysis using the federally mandated Pavement Management System (PMS) and Bridge Management System (BMS).

2). Improve the Operation of the Region's Highway Network

We must improve the efficiency of our transportation network through better timing and linking traffic signals within a corridor, responding to and removing incidents, and providing better information to the traveling public. Road improvements should also be designed to accommodate various modes utilizing a 'complete streets' approach.

3). Expand the System through Select, Appropriate Capacity Enhancements

New highway projects should focus on eliminating regional bottlenecks and improving the operation of the existing road network. Any expansion of the regional road network should be guided by the region's Congestion Management Process.

As the terminus of any vehicle trip, parking is a key component of the transportation system. Parking can be designed and managed in conjunction with other land uses to support transit systems, enhance the vitality of core urban areas, and prevent sprawl from overtaking valuable open space. Parking strategies can also help communities minimize congestion, foster economic development, preserve neighborhood quality of life, and protect natural resources.

Each of the region's municipalities sets its own parking requirements in its municipal zoning ordinance, typically based on national standards. These standards usually dictate that a set number of parking spots be provided for a certain number of dwellings or square footage of office, retail, or industrial space. However, these standards often assume that all trips will be made by car, and that destinations will be isolated and single use in character. They often do not take into account the different types of parking provisions that may be desirable or cost appropriate for different contexts, such as downtowns, suburban shopping districts, or rural areas. There is also little guidance about shared parking, public parking garages, and other strategies that recognize that parking should be sensitive to the broader context rather than being viewed as just a single use. DVRPC recognizes these issues and has identified the following priority parking policies for the region:

- Focus parking standards on parking supply and demand and on innovative ways to calculate parking requirements.

- Use parking management to reduce demand and improve supply, where appropriate or necessary, through such strategies as pricing, car sharing, and shared-parking facilities.
- Use context and design treatments to best match off-street, structured, or bicycle parking to different land uses.
- Consider the environmental impacts of parking, especially the critical issue of stormwater.
- Reduce parking requirements, particularly in areas with good transit service, incentivize shared parking, and better design and manage existing parking resources.

The Congestion Management Process

The Congestion Management Process (CMP) advances the goals of the DVRPC Long-Range Plan and strengthens the connection between the Plan and the Transportation Improvement Program (TIP). It identifies congested corridors and multimodal strategies to mitigate the congestion. Where additions to capacity are appropriate, the CMP includes supplemental strategies to get the most long-term value from the project. The CMP segments congested corridors into subcorridors within which similar transportation strategies seem to be appropriate at a regional planning level of detail. This is accomplished through analysis of transportation and land use data and stakeholder reviews.

The CMP also identifies corridors of regional significance that are not currently congested, but seem likely to become so in the future. Proactive strategies such as access management are recommended for these emerging corridors. The CMP defines procedures for all federally funded major capacity-adding road projects, whether in congested corridors or not. While projects not in congested corridors may be appropriate, they begin with a higher burden of proof, given the limits on funding. Additionally, the CMP provides information about the performance of the regional transportation system and identifies inexpensive strategies appropriate almost everywhere to minimize congestion and enhance the mobility of people and goods.

Regulations require projects that add single-occupancy vehicle (SOV) capacity to be consistent with the CMP in order to be eligible for federal funding. The easiest way for project managers to meet this requirement is to work with the CMP from an early point in the project development process. Further analysis may be required for projects that add SOV but are not consistent with the CMP. When this occurs, the DVRPC Board discusses whether to amend the CMP or suggest other funding for the project. Projects outside of congested corridors must demonstrate consistency with the Plan, follow the CMP Procedures Memorandum, and compare well with projects located in CMP corridors.

The CMP is guided by the Long-Range Plan and provides technical analysis to inform the next plan update. A guiding principle of the CMP is that transportation investments will support the land use goals and policies of the Long-Range Plan. This principle leads to the following set of priorities adopted in the *2009 CMP Report*:

1). Maintain, optimize, and modernize the existing transportation system and rights-of-way. This includes optimizing the services delivered by the system, such as options for and convenience of transfers among modes.

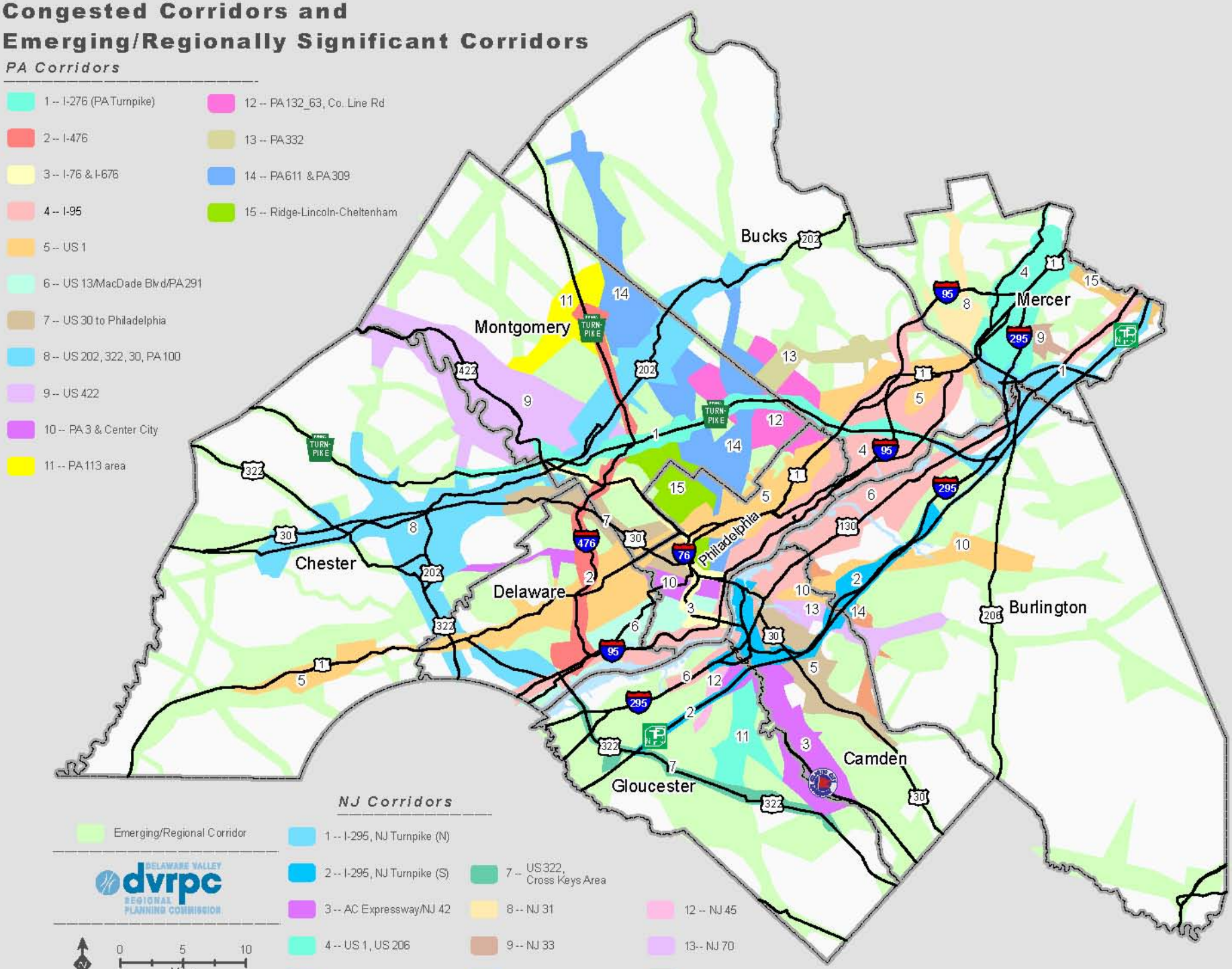
2). Manage demand for transportation by fostering land use patterns and other strategies that reduce the need for and length of trips.

3). Increase capacity of the existing multimodal transportation system, limiting the addition of through-travel lanes.

4). Add new capacity where necessary, limiting the addition of new roads.

The CMP implements these priorities in several ways. One way is through the range of strategies employed and the order in which they are listed. The strategies are grouped into the following categories, which also reflect the order in which they are used in the CMP:

Congested Corridors and Emerging/Regionally Significant Corridors



- Operational Improvements, Transportation System Management (TSM), and Intelligent Transportation Systems (ITS) Transportation Demand Management (TDM);
- Policy Approaches (such as complete streets and transit-oriented development);
- Smart Transportation (to provide better conditions for walking, bicycling, and using modes other than driving alone)
- Public Transit Improvements (programs and projects to increase the capacity of existing services and facilities, such as more frequent service on a bus route); and
- Road Improvement Projects that increase the capacity of existing roads.

Strategies for each CMP subcorridor are selected in a multistep process that includes reviews by stakeholders. In one of several steps, the analysis of CMP criteria is used to suggest strategies that may be reasonable for specific congested subcorridors.

Transit

The region's public transit network is a tremendous asset and provides a significant competitive advantage for the region amid rising energy costs and concerns about climate change. The region's fixed-guideway (rail) network provides a frame around which to anchor growth as we develop into a more sustainable region in the 21st century.

Through the early 20th century, our region's expansion was defined by transit, and what we now call "Classic Towns" thrived along transit corridors and around transit hubs. These historic centers of place are integral to the development of a more sustainable Greater Philadelphia region in the coming decades, but this same history means that the transit infrastructure that defined these places requires maintenance and modernization to continue to effectively meet the needs of residents and fit into a modern multimodal transportation network. Accordingly, the hierarchy of policies for investments in transit infrastructure is listed below. Project types that fall under each priority group are identified for each policy.

1). Ensure the Existing Network is in a State of Good Repair.

Modernizing infrastructure enhances efficiency and performance (by removing speed restrictions from antiquated facilities, for example), adds capacity, improves safety, and mitigates the need for costly wholesale reconstruction in the future.

- Rail guideway facility modernization (track, switches, signals, etc.).
- Rail station rehabilitation/expansion.
- Transit vehicle replacement/modernization.
- Bus facility enhancement (shelters, intermodal facilities, etc.).

2). Operational Investments and Systemwide Strategies to Realize Additional Benefits from the Existing System

Since the region's multimodal transit network is already expansive and interconnected, targeted investments in improving its performance and better integrating facilities with development can have enormous benefits for residents, businesses, and visitors, and often at

comparatively small public expense (relative to major network expansion projects).

- Fare modernization with interoperability across carriers (SEPTA, NJ TRANSIT, PATCO).
- Higher levels of transit service.
  - Higher frequencies and extended hours - If a passenger knows that along every transit route at every time of day, a transit vehicle or train will arrive within a reasonable amount of time, transit becomes much more convenient to use.
  - Faster and more effective transit service - Strategies should be pursued to move passengers faster and more reliably by transit, including signal priority for buses and trolleys at select traffic signals.
- Improved and seamless passenger information systems, including real-time service information.
  - Better signage and route information are a requisite for riders. Schedule and route information for all of our regional transit carriers should be presented together. When combined with fare interoperability, this coordination of passenger information will allow a truly seamless regional transit network, where the divisions between SEPTA, NJ TRANSIT, and PATCO services are invisible to the passenger.
- Invest in stations with coordinated transit-oriented development (TOD).
  - Major transportation centers and intermodal facilities represent major opportunities for coordinated development. An excellent example is Philadelphia's 30th Street Station, the neighboring Cira Center, and additional pending office, retail, and residential development in the station vicinity.
  - Mixed-use TOD in local station or facility areas can generate two-way transit trip flows, reconnect stations with surrounding neighborhoods, and provide an anchor for local commerce.
- Continue to explore innovative "last mile" solutions, such as car sharing, bike sharing, and well-connected taxi or shuttle services to better connect rail stations with more dispersed origins and destinations.

3). Network Expansions that Reinforce Existing or Planned Development Centers

System expansion projects should be pursued only where the new service would reinforce development centers and land use planning objectives. To better integrate with development centers, new stations should accommodate walk-up/bike-up access, and large station parking facilities should be context sensitive; i.e., they should not impair access by other modes or the potential for transit-supportive station area development.

- Passenger rail extensions (commuter/regional rail, heavy urban rail (subway/elevated), light rail, streetcar, or trolley).
- Bus Rapid Transit in exclusive guideways.
- Dedicated guideways for Bus Rapid Transit along existing facilities.

Realizing the vision of a modernized, integrated, and enhanced transit network that maximizes regional and inter-regional mobility will require stakeholders and policymakers to join in making a series of policy and financial commitments at all levels. At the municipal level, officials will need to affirmatively commit to transit supportive zoning and bicycle/pedestrian connectivity in station and transit facility areas. At the transit agency level, the sorts of fare interoperability and seamlessness of passenger information systems envisioned here will require SEPTA, NJ TRANSIT, and PATCO to cooperate through data sharing and financial agreements.

Additionally, operating services at higher frequencies and with extended service hours is expensive and depends on the ability of transit agencies and local governments to absorb higher operating costs. As federal and state transit policy continues to evolve, there may or may not be additional funding available to support these investments. Without significant new federal or state funding, a source of local or regional capital and operating

funding–including private sector investment–may be required for our regional transit network to achieve its long-range potential.

Coordinated Human Services Transportation Planning

Current federal transit law, as amended by SAFETEA–LU, requires that projects funded from the Elderly Individuals and Individuals with Disabilities (Section 5310), Job Access Reverse Commute (JARC), and New Freedom programs be derived from a locally developed, coordinated public transit human services transportation plan (CHSTP). The CHSTP includes linking employment and jobs with transportation services for low-income and disabled individuals, as well as facilitating full participation in society for disabled individuals through transportation and infrastructure projects. DVRPC's continuing responsibilities in the CHSTP are:

- Coordinate, update, and work with regional partners to adopt a CHSTP;
- Administer the project selection process for JARC and New Freedom, which determines allocation of federal and state money to eligible projects; and
- Establish and maintain program outreach/coordination with member governments, transit agencies (who act as designated recipients for the federal money distributed to successful applicants), Transportation Management Associations (TMAs), employers, other transportation providers, and human service agencies.

Bicycle and Pedestrian

Bicycling and walking are low-impact, environmentally friendly, and sustainable modes of transportation that are accessible to a wide range of users for a variety of trip purposes. DVRPC is committed to a region where bicycling and walking are safe, attractive, and accessible travel options for everyone.

To achieve this vision, improvements in infrastructure must be accompanied by changes in policy, which facilitate greater local mobility and regional access. These policies include an emphasis on bicycle- and pedestrian-friendly engineering solutions, more focused enforcement on bicycle and pedestrian safety, as well as the provision of educational programs for cyclists, pedestrians, and drivers.

Federal transportation policy seeks to increase nonmotorized transportation to at least 15 percent of all trips, as well as to reduce the number of nonmotorized users killed or injured in traffic crashes by at least 10 percent. DVRPC concurs with this policy. The outlined priorities below, as well as the pursuit of a regionwide Complete Streets policy, will help meet these goals. The priorities for DVRPC's bicycle and pedestrian program are as follows:

1). Ensure that Current Facilities are Maintained and Up to Date

Maintain existing bicycle and pedestrian facilities, such as bicycle lanes, multiuse paths, and sidewalks, in a state of good repair. This will add capacity, promote a safer environment for walking and bicycling, and set strong standards for future facilities. The primary strategies for maintaining the current facilities are:

- Integrate maintenance costs into the capital program;
- Develop plans for routine maintenance of identified bike and pedestrian facilities;
- Forge partnerships between municipalities, counties, and departments of transportation to share maintenance responsibilities; and
- Ensure that sidewalks are in a state of good repair and prioritize closing gaps in sidewalk networks.

2). Enhance Local Mobility

The majority of trips made by foot or bicycle are local in nature. People in a given community walk or bike to school, to shops, to train stations, or for recreational purposes. These trips are not necessarily associated with bicycle trails or larger network of facilities. Enhancing bicycle and

pedestrian mobility locally will increase the number of trips made by bicycle or foot and promote an environment where these nonmotorized modes are safe and attractive forms of transportation. Projects that can enhance local mobility include:

- Safe Routes to School;
- Intermodal Access to Transit;
- Walkable Communities Workshops;
- Bicycle and Pedestrian Level-of-Service Studies;
- Pedestrian Safety Audits; and
- Development of Municipal Plans.

3). Establish an Integrated Network of Relevant Bicycle Facilities that Connect Communities and Access Important Regional Destinations

The implementation of interconnected on- and off-road facilities will increase mobility and assist the region in prioritizing projects. This network should access major regional shopping and employment centers and serve bicyclists of all ages and skill levels. It should also facilitate intermunicipal and county cooperation. Local communities should be able to access the network easily for longer trips. A comprehensive bicycle network should include the following strategies:

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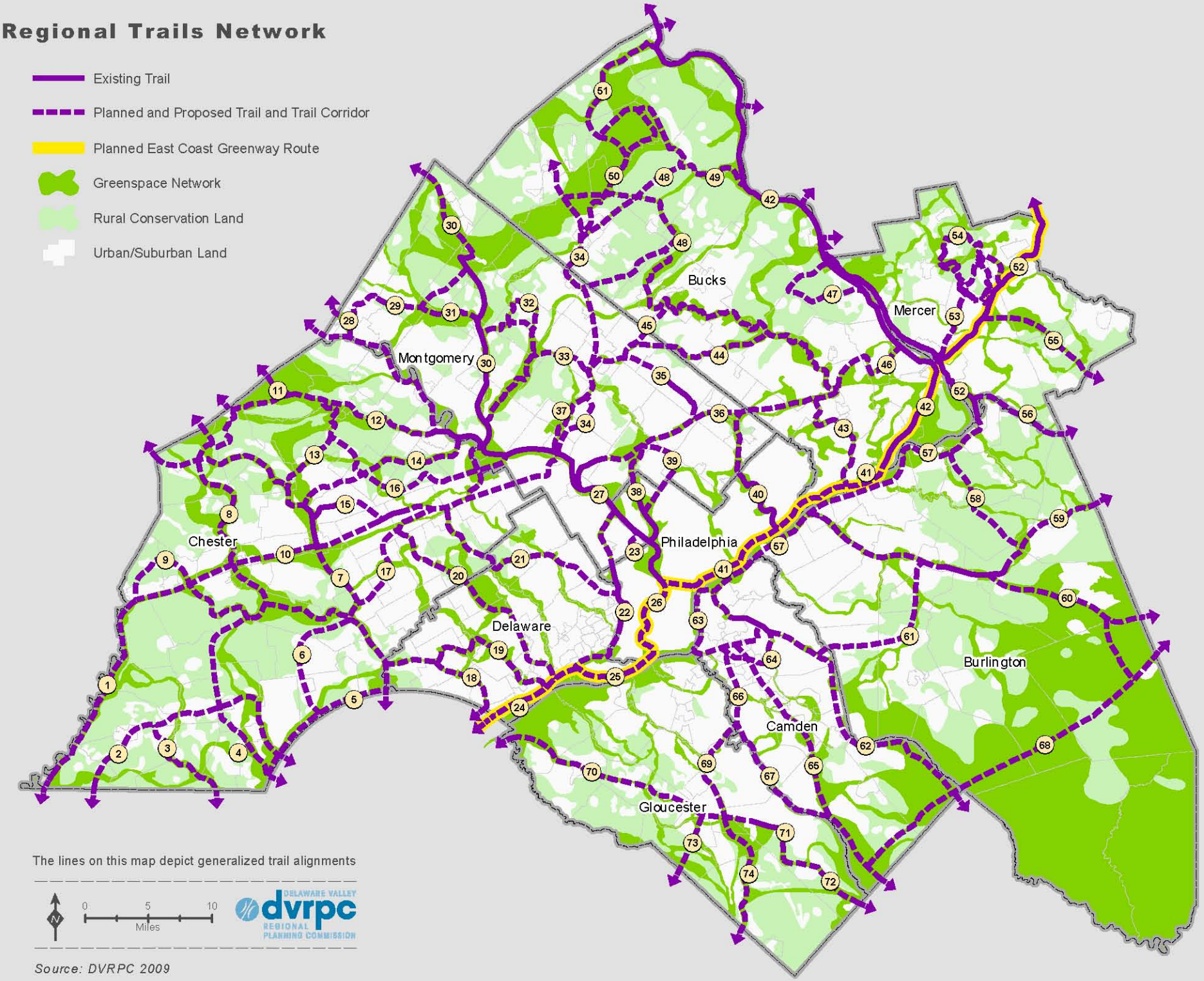
Pennsylvania Trail Network

1. Octoraro
2. Oxford - Avondale
3. Big Elk Creek
4. White Clay Creek
5. Delaware Arc
6. Red Clay Creek
7. Brandywine - Struble
8. Brandywine - West Branch
9. Buck - Atglen
10. Chester Valley
11. Welsh Mountain - St. Peters
12. Sow Belly - French Creek
13. Brandywine - Marsh Creek
14. Pickering Creek
15. Uwchlan
16. Horse Shoe
17. County Seat
18. Harvey Run - Naaman Creek
19. Chester Creek
20. Ridley Creek
21. Newtown
22. Darby - Cobbs
23. Cynwyd Heritage Trail
24. Route 291/13
25. Tinicum - Ft. Mifflin
26. Tidal Schuylkill River Trail
27. Schuylkill River
28. Manatawny
29. West County
30. Perkiomen
31. Sunrise
32. Evansburg
33. Towamencin Creek
34. Liberty Bell
35. Power Line
36. Cross County
37. Stony Creek
38. Wissahickon
39. Cresheim Valley
40. Pennypack
41. North Delaware Greenway
42. Delaware Canal Towpath
43. Neshaminy Creek
44. Little Neshaminy
45. Route 202 Parkway
46. Core Creek
47. Washington Crossing
48. Pennridge Area Network
49. Tohickon Creek
50. Nockamixon
51. Cooks Creek - Lake Towhee

New Jersey Trail Network

52. Delaware and Raritan Canal
53. Trenton - Princeton
54. Lawrence Hopewell
55. Assunpink Creek
56. Crosswicks Creek
57. Delaware River
58. Kinkora
59. Pemberton
60. Rancocas Creek
61. Mt. Holly - Cherry Hill
62. River-to-Bay
63. Camden Waterfront
64. West Jersey - Seashore
65. East Atlantic
66. Gloucester - Mt. Ephraim
67. Big Timber
68. Central Railroad
69. Mantua Creek
70. Raccoon Creek
71. Gloucester County
72. Hospitality Branch
73. Bridgeton Secondary
74. Little Ease

Regional Trails Network



Source: DVRPC 2009

- Review and prioritize existing and planned facilities;
- Determine community priorities;
- Establish appropriate engineering solutions to make recommended facilities more bicycle friendly;
- Establish facility standards for both on- and off-road segments;
- Prioritize regionally significant facilities; and
- Maintain consistent wayfinding signage throughout various jurisdictions.

4). Expand the Regional Off-Road Trail Network

Expanding the network of multiuse trails in both Pennsylvania and New Jersey will offer more cyclists access to off-road facilities, as well as increase exposure to open space and recreational opportunities throughout the region. Trails can also be integrated into the bicycle network when appropriate and serve as important corridors for bicycle travel. The Regional Trail Network Map shows existing, planned, and proposed trails and trail corridors. Priorities relating to the trail network are:

- Prioritization of proposed trail projects;
- Completion of the Schuylkill River Trail, from the City of Philadelphia to Reading, Pennsylvania;
- Establishment of the East Coast Greenway through the region;
- Linking Chester and Montgomery counties through the creation of the Chester Valley Trail;
- Identification of regionally significant trail corridors in New Jersey; and
- Maintain a database of existing and planned trail locations, conditions, and status for the region.

Freight

A major justification for supporting freight planning is the economic benefits that freight activity brings to the Greater Philadelphia region. The Federal Highway Administration's *Freight Transportation: Improvements and the Economy* describes freight transportation as essential to local and national economies. Everything purchased in a store is only there because of the ability to move goods. In a consumer-based economy, we are especially dependent on this ability, and making it easier for goods to move greatly benefits our economy. Goods movement has evolved over time, and businesses and individuals now demand that freight be able to move with increased flexibility and reliability.

The most successful freight programs have adopted a corridor approach to address freight needs. The foundation of the corridor philosophy is to create facilities that move freight in an efficient, safe, and secure manner, while keeping freight out of local communities as much as possible. Two freight corridors have been identified in the region–a north-south corridor and an east-west corridor. DVRPC has been promoting these corridors and the individual transportation facilities within them to balance freight mobility and community goals within the region.

The North-South Freight Corridor includes three major interstate highways (I-95, I-295, and the New Jersey Turnpike), one Class I railroad line (CSX), the Delaware River, with its 33 active port facilities, and the Philadelphia International Airport. The corridor includes the South Philadelphia Freight Complex, which contains the region's largest port, intermodal rail facilities, and a wide array of warehouses. The corridor is the region's main connection with the northeast megalopolis linking Philadelphia with New York and Boston markets to the north and Baltimore and Washington, D.C., to the south.

The East-West Freight Corridor includes two interstate highways (I-76 and I-276/PA Turnpike) and one Class I railroad line (Norfolk Southern). It

intersects the North-South Corridor to also include the South Philadelphia Freight Complex. The corridor connects Philadelphia with South Jersey and Atlantic City, as well as central and western Pennsylvania and the markets of Chicago and the agricultural Midwest.

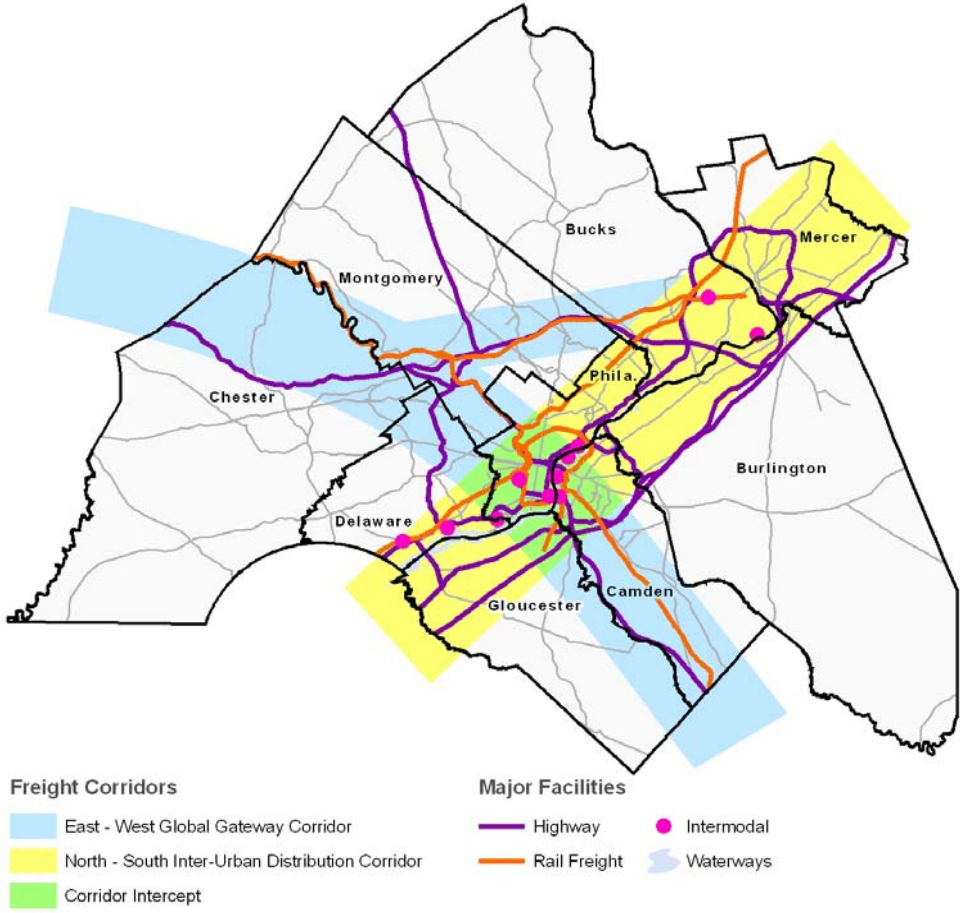
The policies outlined below are contained in the *Long-Range Vision for Freight* plan and were developed in collaboration with the Delaware Valley Goods Movement Task Force. With limited funding available, adopting these policies will improve the freight system and provide a complement over the next 26 years to capital programs and projects. The policies have been organized into five sections, which serve as overarching themes to the long-range vision of freight developed by DVRPC and the Delaware Valley Goods Movement Task Force.

1). Recognize the Value of Freight

Freight is a major economic generator. While freight brings positive benefits to the public, freight projects and interests have often taken a backseat to those of the passenger in terms of transportation needs. Public benefits provided by freight movement, such as economic and, in some instances, air quality, should be taken into account, and public funding should be considered to pay for a portion of these projects. In the past, large freight projects have been funded primarily through federal earmarks. However, with the recent emphasis on trying to reduce earmarks, it is important to identify dedicated public funding for freight projects. Key target strategies include:

- Educate decision-makers on the economic benefits and necessity of goods movement.
- Ensure that transportation revenues support projects that help freight.

Delaware Valley Freight Corridors



Source: DVRPC 2009

- Revise benefit-cost analyses to include all freight impacts.
- Continue and augment both railroad and seaport capital funding.

2). Practice Good Neighbor Strategies

Additional noise and sound, reduced air quality, and increased traffic, whether real or perceived, are some of the concerns that communities have with regards to freight movement. These "not in my backyard" (NIMBY) attitudes can restrict projects meant to help the movement of goods and increase freight's economic benefits. It is essential for freight facilities and operators to work with communities to help educate the public on the benefits of freight and to decrease both the real and perceived concerns. Below are examples of strategies that could improve the neighborhood relations of the freight industry:

- Improve signage and infrastructure for local truck traffic generators.
- Implement quiet zone corridors.

3). Be Environmentally Friendly and Sustainable

With the recent attention and emphasis placed on the areas of climate change and sustainability, and to bridge the gap into the future, the freight community needs to recognize the value of "going green." Green technologies represent a great way for shippers and carriers to become more efficient in terms of fossil fuel consumption. This will help lead to freight industry profits being less dependent on the price of crude oil. Also, creating more environmentally friendly freight movement technologies will give freight a more positive public image, which may help resolve some of the NIMBY attitudes that slow projects. Environmentally friendly and sustainable actions include the following:

- Increase truck idle reduction programs and idle-free technology.
- Implement other fuel reduction strategies.
- Advance green ports initiatives.
- Increase use of environmentally friendly low-emissions yard locomotives.

4). Enhance the Linkages between Freight-Related Transportation and Land Use

The DVRPC Long-Range Plan has always been focused on linking transportation and land use. It is important to develop tools that allow for the placement of new distribution centers, warehouses, and other freight-generating businesses in locations that are well situated for transportation. Many different agencies help companies find industrial space to locate these types of businesses, but there is no available database indicating proximity to associated transportation infrastructure. Major facilities need to be located near the highway, preferably near a rail line, to which a siding could be built, and in a community accepting of the business. Below are a series of policies that can improve these links:

- Maintain existing industrial areas.

- Continue to promote and support freight villages.[19]
- Promote advance reservation systems for pick-ups and deliveries at large freight generators.

5). Make Operational Improvements

Studies have proven that additional operational improvements such as Intelligent Transportation Systems (ITS) can make roadways and other modes increase the capacity of the transportation system without expanding facilities. By providing more information, it becomes possible to have better detours and better emergency response, thus decreasing the amount of time that goods sit in congestion. Below are a series of policies that were developed to improve the operations of the transportation infrastructure from a freight point of view.

- Continue to develop connections between DOT operations centers and commercial motor vehicles.
- Expand and maintain Incident Management Task Forces.
- Add ITS components across all modes.
- Expand the coverage area and reliability of weigh-in-motion monitoring.
- Implement additional regional security systems.

DVRPC's *Long-Range Vision for Freight* includes a set of Highways and NHS Connectors, Freight Rail, and Ports/Facilities projects that were identified and prioritized by the Delaware Valley Goods Movement Task Force as important for the movement of freight through the region. Most of the Highways and NHS Connectors projects are being funded through the Plan, but the Freight Rail and Ports/Facilities projects do not have Long-Range Plan funding at this time.

[19] Freight villages promote efficient land use and transportation practices much in the same way that transit-oriented development initiatives (TOD) do. A freight village is described as a defined area where "...all activities relating to transport, logistics, and the distribution of goods are carried out by various operators in a coordinated fashion." Freight villages pose many advantages, such as encouraging "freight as a good neighbor" operational and design practices, combating "freight sprawl," and transforming former manufacturing and brownfield sites (e.g., former steel mills) into full service, value-added distribution centers.

Aviation

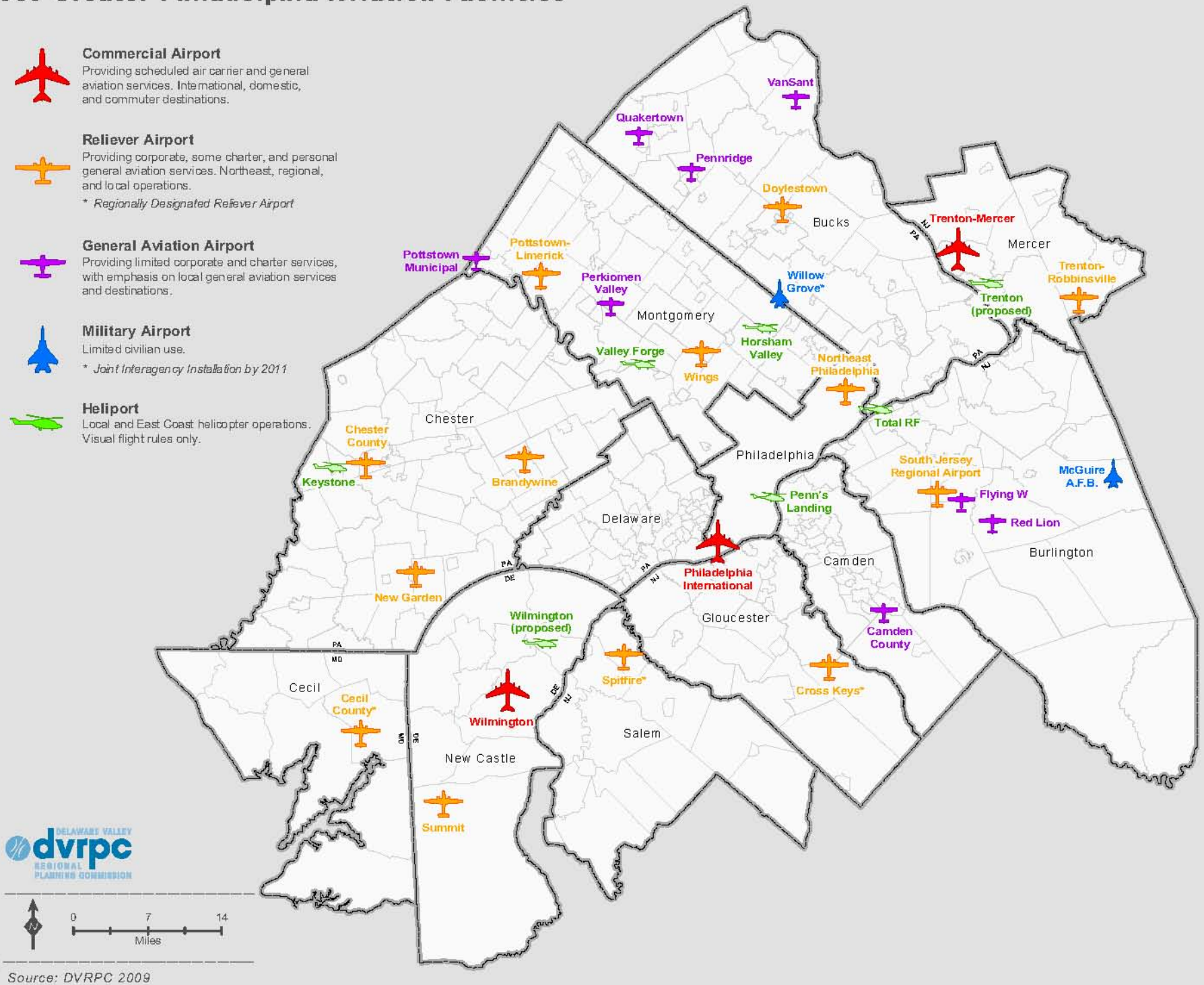
Air travel is a critical link in connecting the region to the global economy. The Greater Philadelphia region is served by three commercial airports, with Philadelphia International Airport being the most prominent. The region is also home to several reliever and general aviation (GA) airports, which serve their own markets but also complement and support the commercial airports. For the purpose of aviation planning, DVRPC covers a larger area than its traditional nine-county jurisdiction, adding Salem County in New Jersey, New Castle County in Delaware, and Cecil County in Maryland. The Aviation Map shows the aviation facilities within this extended area.

Aviation planning currently has many challenges with the start of a new recessionary business cycle, political change at the federal government's executive and legislative branches, and antiterrorism security requirements becoming more permanent. With the worsening U.S. and global economic condition and both general aviation and commercial operational traffic in decline, federal and state airport funding levels are uncertain. The passage of the economic stimulus bill–The American Recovery and Reinvestment Act of 2009–provides an increase of Airport Improvement Program (AIP) funds of $1.1 billion, in the short term.

The continuation of antiterrorism security measures since 2001 has caused a paradigm shift on both GA and commercial traffic operations and demand, especially in the dense Northeast Corridor, with high levels of aviation congestion and delay. New security measures in the planning realm call for airline-type security requirements to be imposed on nonairline aircraft weighing over 12,500 pounds. These measures would require that even a small charter operator or corporate owner of such aircraft accomplish the same level of scrutiny and record keeping as scheduled airlines.

The financial burdens on corporate and GA airports from security, airspace, fuel price, and the recession are threatening facility preservation. Commercial scheduled airline operators have had massive financial

2035 Greater Philadelphia Aviation Facilities



Source: DVRPC 2009

difficulties since 2001. These difficulties varied from tremendous fuel price increases, mandated expensive security measures, and a downturn in passenger demand, manifesting in 2008 with bankruptcies, reorganizations and mergers, and reduced passengers flights and revenue.

Since 2001, GA operations have suffered from annual flight operation declines of up to nine percent within the DVRPC region. Flight operation declines are attributed to raising fuel prices, airspace restrictions and controls resulting from congestion around large airports, and new airspace security requirements since 2001. Compliance has adversely affected flight training, aircraft charter, and recreational operations frequencies. GA operations have also been negatively affected by an aging pilot population, resulting in fewer pilots qualifying annually for their flight physicals. With flight training in decline and existing pilots aging, an aggressive recruitment and training program will be needed to meet the future demands of commercial carriers and charter operators and to support recreational operations.

With flight operations trending downward and development pressures increasing, the survival of many existing airports is in question. Preservation of these facilities is paramount to future aviation success in stimulating regional economic activity and relieving congestion at commercial airports. The replacement cost and feasibility of building new airports is prohibitive, and available land is nonexistent for future replacement airports. Current long-range planning must emphasize the lowering of airport expenses, raising revenue, and preservation of existing facilities.

Aviation infrastructure in the northeastern United States has been eroding due to inadequate increases in commercial capacity, loss of GA and reliever capacity, and accelerating restrictions on airspace. Critical airports are operating at their capacity limits; therefore, essential regional aviation infrastructure must be identified, preserved, and enhanced where necessary. Traditional municipal control over zoning, land use, and developmental decisions also contribute to the decline of aviation infrastructure. The state and federal governments must develop stronger regulations, funding program incentives, and operations standards to better protect the regional aviation infrastructure as a component of the national and international aviation system.

Where aviation will be 26 years from now was much easier to predict when the industry was in an expansionary phase, which began after World War II and lasted until the events of September 11, 2001. With the needed imposition of heightened security requirements and other technologies, such as the Internet offering alternatives to some business travel, we must plan in a business environment that is in a maturing phase. We must strengthen our aviation infrastructure consisting of airports and their facilities and maintain and train new pilots, flight attendants, aviation mechanics, and airport operation management personnel. In order to reach these goals and meet the aviation needs of Greater Philadelphia, the region must target the following specific policies. These policies are incorporated in the Regional

Aviation System Plan (RASP) and were developed in collaboration with the Regional Aviation Committee.

1). Increase Capacity

- Provide increased regional commercial aviation operations capacity, with increased safety and minimum delay to serve population and employment concentrations in the region within one-hour travel time of commercial airports. This includes ground, airspace, and access trip improvements.
- Provide adequate business and general aviation aircraft operating and storage capacity within one-half hour of population and employment centers.
- Improve select facilities regarding runway length, width, guidance systems, and apron/hangar capacity to satisfy suburban market area demand and provide sufficient noncommercial reliever capacity to ensure maximum commercial utilization of Philadelphia International Airport. Runway extension criteria must reflect the shift in the noncommercial fleet to include very light and corporate jets based at suburban airports.
- Provide and expand helicopter services for commuters, medical services, and police functions in the region's major urban centers.

2). Airport Preservation

- Preserve essential aviation facilities and, where necessary, transfer ownership of public-use airports from private to public owners. In cases where private owners remain in control, provide public capital subsidies in support or match of provided investment to ensure extended existence of an aviation facility.
- Support existing or create new facilities that offer education of new aviation personnel, including pilots, aviation mechanics, air traffic controllers, and flight safety personnel.
- Strengthen enforcement of local zoning laws where urban encroachment threatens existing airports and become more proactive in preventing incompatible land uses by finding better suited alternatives.

3). Environmental Issues

- Enhance airports as needed to support development that integrates environmental preservation and neighborhood concerns regarding noise impacts and pollution, with improvements to operating capacity and flexibility.

4). Capital Investments

- Ensure adequate regional capital investment from federal, state, local, and private sources, which represent the region's "fair share" of statewide and national annual allocations based on population, employment, aircraft, operations, and other appropriate criteria.
- Develop existing, rather than new, facilities as a means of reducing capital requirements.
- Develop federal and state legislation and regulatory reforms to enhance the business viability of the general aviation airports, and expedite funding of capital improvements safety of operations and other RASP goals.

5). Safety and Security

- Improve safety incursions according to FAA regulations, where feasible and justifiable.
- Adopt reasonable, reliable, and economic antiterrorism regulations that offer improved general aviation security without additional financial burdens. New technology coupled with practical means of implementation needs to be found based on aviation flight capabilities and aviation risk assessments. In addition, enforcement action capabilities need to be enhanced.

6). Airport Access

- Provide and improve commercial facilities to efficiently facilitate intermodal access and transfers.
- Explore options of direct high-speed, intercity rail access to commercial airports.
- Improve existing regional rail and bus access, especially in view of regional connectivity to decrease non-high occupancy vehicle traffic to airports via highways.

CHAPTER 5

Financial Plan and Transportation Investments

A key component of any Metropolitan Planning Organization's long-range plan is a vision for how the region will invest in transportation over the life of the plan. Federal regulations require that regional long-range transportation plans be fiscally constrained. This means that total transportation expenditures identified in a long-range plan must not exceed the total revenues reasonably expected to be available for the region over the life of the Plan.

DVRPC worked in consultation with its federal, state, local, transit, and operating authority partners to develop the *Connections* financial plan and set of transportation investments. DVRPC and its partner operating agencies identified the level of expenditure for all transportation infrastructure that is needed to achieve and maintain a state of good repair without considering fiscal constraint. Following the lead of both state departments of transportation, DVRPC has pursued a policy to "fix-it-first," which allocates more funding to maintaining the existing roadway and transit networks. The goal is to achieve and maintain a state of good repair for existing transportation infrastructure before undertaking significant expansions to the system.

To estimate revenue for the *Connections* Plan, DVRPC identified all federal, state, and local sources that the region can reasonably expect to receive through the year 2035. Reasonably expected revenues are then allocated to the different expenditure categories based on policy and identified need. Need is much greater than available revenue–the difference between these is shown as the region's minimum funding deficit. The funding deficit will be much greater if the full need for system expansion is also considered.

Federal requirements dictate that fiscal constraint be determined using year-of-expenditure (Y-O-E) dollars so that inflation is accounted for when determining project costs. A projected inflationary factor converts current-year dollars to Y-O-E dollars by using a compound annual inflation rate. Federal Highway Administration (FHWA) guidance recommends using a four percent inflation rate as a minimum when developing a long-range financial plan. Rapid increases in construction costs in recent years have surpassed four percent, but have recently begun to return to historical levels.

The financial plan must be fiscally constrained over its life and for each individual funding period. Three funding periods will comprise the total 26-year time span of the *Connections* Plan. The short-term funding period begins in the first year of the Plan, fiscal year (FY) 2010, and ends six years later, in FY 2015. The midterm period begins in FY 2016 and ends 10 years later, in FY 2025. The long-term period begins in FY 2026 and runs for 10 years to the horizon year of the Plan, in FY 2035. Individual transportation projects that require years to design and build may span multiple funding periods.

Key decisions for the financial plan were made by two long-range plan subcommittees, one for each state subregion. The subcommittees were composed of representatives from DVRPC's Regional Transportation Committee (which is made up of representatives of each state DOT, transit agencies, transportation authorities, member city and county governments, and the Regional Citizens Committee). The long-range plan subcommittees reviewed the revenue and expenditure assumptions, decided how to allocate revenue to best meet system needs, and selected the major regional projects included in the Plan.

Revenue Assumptions and Estimates

Preparation of this financial plan revenue estimate included a review of historical data and trends including the statewide FY 2008 financial guidance documents from both Pennsylvania and New Jersey, previous statewide transportation improvement programs (STIPs) information from state DOTs and transit agencies, FHWA SAFETEA-LU planning guidance, and other relevant materials. All planning principles and financial assumptions in identifying federal and state financial resources are developed with and reviewed by federal, state, and transit partners.

Revenue Assumptions

Revenue estimates are for capital project expenditures only and do not include any operating funds. All revenue amounts are in Y-O-E dollars, as required by federal regulations. No new or undefined funding sources are recognized in the fiscally constrained Plan.

Federal Funding

FHWA guidance is to assume that federal transportation funding will increase three percent, compounded annually. DVRPC assumes that federal funding will increase 19.4 percent (three percent compounded annually) each six-year funding period, mimicking federal transportation legislation authorization periods. This method assumes an 80/20 split of federal funds between highways and transit, following a three percent takedown. The current federal transportation bill, SAFETEA-LU, expired in September 2009. This bill allocated $294 billion in federal transportation dollars over a six-year period from FY 2004 to FY 2009. The next transportation act was scheduled for October 2009; but has not been acted on to date by Congress. As a result, there are currently few concrete details about this legislation that can be used to make planning assumptions, and the current authorization is likely to continue to be extended for an undetermined amount of time.

Due to economic conditions in the United States and throughout much of the world, Congress recently enacted a major infrastructure building stimulus package, the American Recovery and Reinvestment Act (ARRA) of 2009. This stimulus drastically increases federal spending in the short term on road, transit, school, water, sewer, and electricity infrastructure. The *Connections* Plan does not account for additional revenue resulting from the stimulus, since this is a one-time influx of funds rather than a change to the long-term trend. Its primary impact will be on the expenditure side of the Plan, reducing the backlog of existing infrastructure repair needs. The needs assessment reflects the impact of ARRA funding.

New Starts and Small Starts Funding

The Federal Transit Administration's (FTA) discretionary New Starts program is the federal government's primary financial resource for supporting locally planned, implemented, and operated fixed-guideway transit capital investments. Through consultation with the FTA, DVRPC assumes that the region as a whole may be able to receive two New Start matches over the life of the Plan. These two New Start matches are estimated to be $700,000,000 (in 2009 dollars), evenly divided into each subregion and allocated to projects expected to occur in the middle funding period.

Small Starts funding is available to projects with a total capital development cost of under $250 million. Maximum funding levels for any Small Starts project is $75 million. DVRPC assumes that the Pennsylvania and New Jersey subregions will both receive the equivalent of $75 million in Small Starts funding over the life of the Plan. These funds are also allocated to projects in the middle period of the financial plan.

State Funding

In July 2007, the Commonwealth of Pennsylvania passed Act 44, which dramatically increased transportation funding in the commonwealth. The Act increased funding by 30 percent over previous levels, based primarily on placing new tolls on Interstate 80 and a new lease agreement between the Pennsylvania Turnpike Commission (PTC) and the commonwealth. Adding tolls to I-80 requires FHWA approval, which has not been granted and appears increasingly unlikely to happen under the current federal transportation authorization. Without I-80 tolling, increased funding levels are capped at $250 million per year for transit and $200 million per year for roads and bridges beginning in FY 2011. By contrast, with I-80 tolling, Act 44 revenues will increase to $512.5 million for roads and bridges and $410 million for transit in FY 2011, and will then increase by 2.5 percent each year thereafter. If I-80 tolling is not implemented, Pennsylvania forecasts $20.3 billion less in state transportation funds over the life of the *Connections* Plan.

Due to the high level of uncertainty surrounding the implementation of tolls on I-80, DVRPC is basing its revenue assumptions on the guaranteed funding levels in Act 44 that occur without tolling. New Act 44 funds, based on the turnpike lease agreement with the PTC, are capped at $450 million. There are no annual increases on the lease payment amounts in the current legislation. Existing, non-Act 44 Commonwealth of Pennsylvania funding levels are estimated to grow at a rate of three percent compounded annually.

Act 44 also created a new Public Transit Trust Fund (PTTF), which receives funding from the state sales tax, lottery revenues, payments from the PTC, and other tax monies. The turnpike lease provides funds for the Section 1514 Transit Capital Asset Management program of Act 44. These are state discretionary funds with guaranteed levels of $50 million in FY 2008, $100 million in FY 2009, and $150 million in FY 2010. In FY 2011, this fund will begin to grow by 2.5 percent annually with I-80 tolling, and will have zero funding without it. The state also grants $125 million in annual transit bond funds under Section 1514. Section 1517 Transit Capital Improvements Program funds come from the 4.4 percent of the state sales tax that is dedicated to transit.

In the State of New Jersey, the legislation for the Transportation Trust Fund is set to expire in FY 2011. DVRPC assumes that the state legislature will enact new Trust Fund legislation, as it has historically done, with increases projected at three percent per year compounded annually.

Local Funding

In *Destination 2030*, local transportation match funds were included with state revenues. For the *Connections* Plan, these funds are shown separately in a local funding category. As a result, state funding levels will appear to be somewhat lower in the *Connections* Plan than they were in *Destination 2030*. The amount of local funds forecast for the life of the Plan is based on match fund levels in the current Pennsylvania and New Jersey statewide transportation improvement programs (STIPs). Local funds are forecast to grow with state and federal funds to maintain their appropriate match levels.

A key Plan principle in the *Connections* Plan is for the region to generate additional funding through a dedicated local revenue source as a way to help close the gap between the region's revenues and its needs. Montgomery County is the first governmental entity in the region to consider raising additional local funds. The county is currently debating a proposed $150

million dollar bond program (Montgomery County Transportation Program). Though the creation of this or any other new local funding stream is a realistic possibility, no currently nonexistent funding sources have been included in the local funding revenues of the *Connections* Plan and will not be until there is definitive funding in place.

Authority and Other Funding

DVRPC works with several partner transportation authorities that generate their own revenues, generally via tolling. Revenue generated by partner authorities is not included as a revenue source in DVRPC's Long-Range Plan. For the most part, all capital and operating expenditures of these authorities are covered by authority toll revenues. In some instances, federal dollars are used in conjunction with authority revenue to fund specific capital projects. In these cases, DVRPC tracks both federal and nonfederal capital expenditures for such projects and accounts for the federal funding as a part of its regional transportation expenditures.

Estimated Revenue for the *Connections* Plan

Federal and state funding allocation formulas, along with anticipated local match requirements, were used to develop the revenue estimates for the *Connections* Plan. The *Connections* Plan anticipates $64.8 billion Y-O-E dollars in total federal, state, local, and Small and New Starts funding over the life of the 26-year Plan.

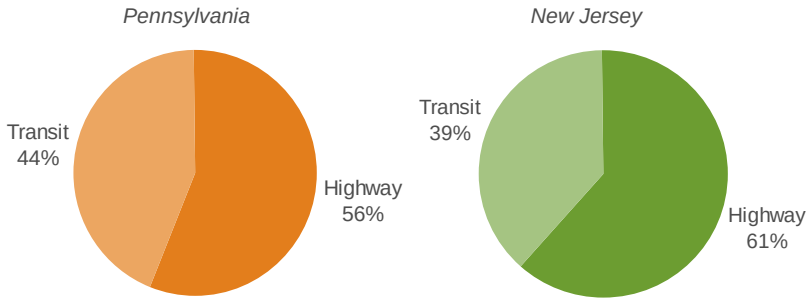
The Pennsylvania subregion allocates 56 percent, $22.7 billion, to highway and bridge funding, and the remaining 44 percent, $17.9 billion, for transit funding. Total funding for the Pennsylvania subregion is $40.6 billion over the life of the *Connections* Plan. The New Jersey subregion allocates 61 percent, or $14.9 billion, to highway and bridge funding. The remaining 39 percent, or $9.3 billion, is for transit funding. This subregion anticipates a total funding level of $24.2 billion over the life of the Plan.

DVRPC Region Funding Levels by Period and Mode
(In Billions of Y-O-E $s)

Subregion	Mode	Funding Period 2010-2015	2016-2025	2026-2035	Plan Total
Pennsylvania	Highway	$ 3.4 B	$ 8.3 B	$ 10.9 B	$ 22.7 B
	Transit	$ 3.2 B	$ 5.8 B	$ 7.7 B	$ 16.7 B
	New Start/ Small Start	$ 0.0 B	$ 1.2 B	$ 0.0 B	$ 1.2 B
	Subregion Total	**$ 6.6 B**	**$ 15.3 B**	**$ 18.6 B**	**$ 40.6 B**
New Jersey	Highway	$ 2.0 B	$ 5.5 B	$ 7.4 B	$ 14.9 B
	Transit	$ 1.0 B	$ 3.0 B	$ 4.1 B	$ 8.1 B
	New Start/ Small Start	$ 0.0 B	$ 1.2 B	$ 0.0 B	$ 1.2 B
	Subregion Total	**$ 3.0 B**	**$ 9.8 B**	**$ 11.4 B**	**$ 24.2 B**
DVRPC Total		**$ 9.6 B**	**$ 25.1 B**	**$ 30.1 B**	**$ 64.8 B**

Totals may not add up due to up rounding.
Source: DVRPC 2008

Revenue Allocation by Mode Share



Source: DVRPC 2009

Transportation Needs Assessment

DVRPC worked with its partner operating agencies to develop a full needs-based assessment for all transportation infrastructure for the *Connections* financial plan. Needs estimates, based on asset management systems analysis, seek to achieve and maintain a state of good repair for all transportation system components as defined by each operating agency.

The financial plan tracks revenue and expenditure streams by mode (highway and transit) for both of DVRPC's state subregions. DVRPC further disaggregates each mode's expenditures into seven highway and six transit categories. The tables to the right and on the following page identify each funding category for highway and transit and the types of projects that they consist of.

On the highway side, categories H1 and H2 are capital maintenance funds for renovating and rehabilitating existing pavement and bridge infrastructure. Needs estimates for these categories were developed using the federally required Pavement Management System (PMS) and Bridge Management System (BMS) databases, which track the current condition of each roadway lane mile and bridge.

H3 represents projects that are specific to operational improvements, such as intersection/interchange reconstruction and roadway realignment, to improve the functionality and safety of the roadway network. This is a difficult category to estimate funding need, as it is potentially unlimited. DVRPC based this need estimate by increasing current funding levels in the 2009-2012 TIP by 20 percent.

ITS and Signal, H4, is shown as a separate category for the first time in the *Connections* Plan. This reflects the region's goal and policy of better managing existing roadway capacity to improve traffic flow before expanding the roadway system. The region's *Transportation Operations Master Plan,* developed in collaboration with operations staff at FHWA, state departments

Highway Expenditure Categories

Category ID	Category	Subcategories
H1	Pavement Reconstruction, Rehabilitation, Resurfacing, and Restoration	Preventative Maintenance; Resurfacing; Restoration; Reconstruction; Rehabilitation; Local and County Federal Aid Road Maintenance
H2	Bridge Replacement and Restoration	Preventative Maintenance; Painting; Substructure, Superstructure, Bridge Deck, Parapet, Dam, Culvert, or Viaduct Replacement or Rehabilitation; Bridge Removal
H3	Operational Improvements	Access Management; Interchange Reconstruction or Realignment; Channelization; Roadway Realignment; New Turn Lanes; Roundabout; NHS Connectors; Pavement Markings; Regional Safety Initiatives (HSIP); Rail Crossing
H4	ITS and Signal	ITS Deployment; Traffic Operations Center(s); Incident Management; Signal Modernization, Interconnection, or Closed Loop Signal Systems; Traffic Management Systems
H5	Highway New Capacity	New Roads, Lanes, Bypasses, Bridges, or Interchanges; Roadway Relocations
H6	Bike and Pedestrian	Streetscaping; Sidewalks; Multiuse Paths; Bike Lanes; Pedestrian and Bike Safety Improvements; Pedestrian Bridge or Tunnel; ADA Curb Cuts
H7	Other	Signage; Lighting; Drainage; Debt Service; Environmental Mitigation; TransitChek; Mobility Alternatives Program; Ozone Action Programs; CMAQ; Transportation Management Associations; Parking Facilities; Park and Ride

Source: DVRPC 2009

of transportation, transit operators, and area Transportation Management Associations (TMAs), is the basis of the needs assessment for this category.

H5 is the funding category for all projects that add capacity to the roadway network, from widening existing facilities to new roads or interchanges. Need was estimated for both major regional projects, as well as a minor new capacity line item. Major regional projects are projects that have a significant impact on regional travel. By definition, almost all major regional projects are either new highway capacity or new fixed-guideway transit facilities. Major regional projects are specifically listed in the Plan. Minor new capacity projects are widenings of generally less than a few miles in length on minor arterials and collectors. Minor new capacity projects are not listed in the Plan, but funding is included for such projects as they are identified and come up for funding through the TIP cycle. The need for major regional projects was based on those projects included in the *Destination 2030* Long-Range Plan. Member governments and departments of transportation were asked to review the set of projects contained in *Destination 2030* and revise the project scope, timing, and cost, as appropriate. They were also asked to submit any additional priorities for consideration for inclusion in the *Connections* Plan. The need for minor new capacity was based on the amount programmed in the current 2009-2012 TIP and forecast over the life of the Plan.

Bike and pedestrian (H6) is a separate category for the first time in this financial plan and it reflects the region's desire to continue to become more bike and pedestrian friendly. Need was estimated by maintaining current funding levels in the 2009 to 2012 DVRPC TIP and constructing all unbuilt multiuse paths in DVRPC's Regional Trail Network.

H7 is a miscellaneous expenditures category, including lighting, signage, parking facilities, planning, engineering, drainage, environmental mitigation, educational and marketing programs, such as Ozone Action and Mobility

Transit Expenditure Categories

Category ID	Category	Subcategories
T1	Rail Infrastructure Rehabilitation and Restoration	Track Rehabilitation, Resurfacing, or Replacement; Catenary Rehabilitation or Replacement; Signal Rehabilitation or Replacement; Rail Bridge Improvements; Regional Substation Improvements; Positive Train Control; Amtrak Lease Agreements
T2	Vehicle Rehabilitation and Replacement	New or Rehabilitated Buses, Paratransit, Commuter Rail, Light Rail, or Heavy Rail Vehicles; Maintenance and Storage Facilities; Vehicle Maintenance Equipment
T3	Station Enhancements	Station Rehabilitation and Improvements; Access Improvements; Expanded Parking; Transit-Oriented Development; Park and Ride; Parking Lot Rehabilitation or Expansion; Transportation Center; ADA Compliance
T4	System and Operational Improvements	ITS; Fare Modernization; Real-Time Information; Signal Preemption; Doubling Tracking; Sidings; Light Rail Restoration; Smart Stations
T5	New Transit Capacity	New Station on Existing Line (Including New Parking Facilities); Extension of Existing Line; New Bus or Rail Route; Bus Rapid Transit
T6	Other	Safety; Security; Coordinated Human Services; Debt Service

Source: DVRPC 2009

Alternatives Program, Transportation Management Associations (TMAs), and Congestion Mitigation and Air Quality (CMAQ), and debt service.

Transit funding categories T1, T2, and T3 represent capital maintenance funds for existing rail, vehicle, and station infrastructure. These funds will be shared between all the transit operators in each subregion. T3 is shown as a separate category for the first time in the *Connections* Plan. It was previously included as part of the T1 category. Regular vehicle track, signal, catenary, vehicle overhaul and replacement, station renovations, and ADA accessibility needs were used to develop the need for each of these three categories. T4 reflects system needs for investment in improving the functionality of the existing transit system; needs estimates were developed by DVRPC and regional transit agencies.

T5 is the new capacity project funding category for new transit facilities, routes, and lines. Need for this category is based on a short list of projects

developed by the long-range plan subcommittee and includes projects listed in the *Destination 2030* Plan, the DVRPC *Long-Range Vision for Transit Report,* and the Dots and Dashes exercise. T6 is a miscellaneous category including safety, security, coordinated human services, and debt service. Need for this category is estimated by maintaining current funding levels over the life of the Plan, adjusted for inflation.

Pennsylvania Subregion Total Assessed Transportation Need

DVRPC worked with PennDOT to estimate transportation needs for all highway categories, and with SEPTA, DRPA/PATCO, and Pottstown Urban Transit (PUT) to estimate needs for all transit categories. This estimate also includes what DVRPC forecasts as the needs for county and local roadways eligible for federal aid. In order to arrive at Y-O-E dollars for the needs assessment, DVRPC applied an annual four percent rate of inflation out to the midyear in each funding period. The midyears are 2013 for the first funding period, 2021 for the second funding period, and 2031 for the third funding period.

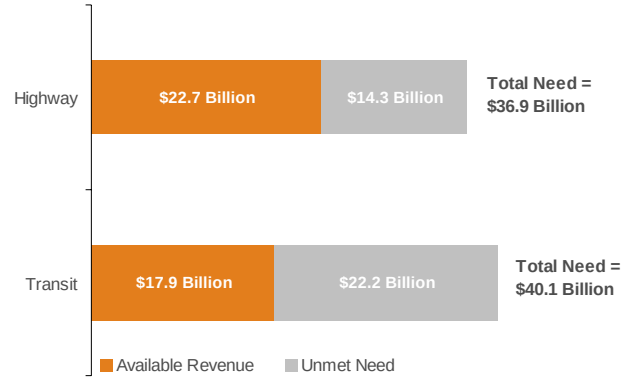
The Pennsylvania subregion's total estimated funding need by mode over the next 26 years is shown on the following page. On the highway side, there is a total estimated funding gap of $14.3 billion over the life of the Plan. Only about 61 percent of the total need is able to be funded. On the transit side, there is a total funding deficit of about $22.2 billion over the life of the Plan. Only about 45 percent of the total identified need is able to be funded. The Pennsylvania subregion's funding deficit, based on limited new capacity, is estimated at $36.4 billion over the life of the *Connections* Plan. The funding deficit estimate is based on primarily maintaining and repairing the subregion's transportation infrastructure with limited, focused new capacity investment.

Pennsylvania Subregion Total Expenditure Need (In Billions of Y-O-E $s)

Mode	Subcategory	2010-2015	2016-2025	2026-2035	Total
Highway	H1. Pavement Recon./Rehab./Resurf./Rest.	$ 1.46 B	$ 3.33 B	$ 4.56 B	**$ 9.34 B**
	H2. Bridge Replacement and Restoration	$ 3.80 B	$ 7.36 B	$ 8.62 B	**$ 19.78 B**
	H3. Operational Improvements	$ 0.33 B	$ 0.77 B	$ 1.13 B	**$ 2.23 B**
	H4. ITS and Signal	$ 0.18 B	$ 0.62 B	$ 0.97 B	**$ 1.77 B**
	H5. Highway New Capacity	$ 0.71 B	$ 1.23 B	$ 0.59 B	**$ 2.53 B**
	H6. Bicycle and Pedestrian	$ 0.11 B	$ 0.25 B	$ 0.45 B	**$ 0.81 B**
	H7. Other	$ 0.07 B	$ 0.15 B	$ 0.22 B	**$ 0.44 B**
	Highway Subtotal	**$ 6.66 B**	**$ 13.70 B**	**$ 16.54 B**	$ 36.90 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	$ 1.06 B	$ 2.31 B	$ 3.14 B	**$ 6.50 B**
	T2. Vehicle Rehabilitation and Replacement	$ 1.26 B	$ 3.47 B	$ 6.75 B	**$ 11.48 B**
	T3. Station Enhancements	$ 0.75 B	$ 1.69 B	$ 2.49 B	**$ 4.94 B**
	T4. System and Operational Improvements	$ 0.28 B	$ 0.57 B	$ 0.28 B	**$ 1.12 B**
	T5. Transit New Capacity	$ 0.14 B	$ 1.41 B	$ 12.99 B	**$ 14.54 B**
	T6. Other	$ 0.38 B	$ 0.57 B	$ 0. 52 B	**$ 1.47 B**
	Transit Subtotal	**$ 3.85 B**	**$ 10.03 B**	**$ 26.17 B**	$ 40.05 B
PA Subregion Total		**$ 10.51 B**	**$ 23.73 B**	**$ 42.71 B**	**$ 76.95 B**

Totals may not add up due to up rounding.
Source: DVRPC 2009

Pennsylvania Subregion Funding Deficit (In Billions of Y-O-E $s)



Source: DVRPC 2009

New Jersey Subregion Total Assessed Transportation Need

DVRPC worked with NJDOT to estimate transportation needs for all highway categories, and with NJ Transit and DRPA/PATCO to estimate needs for all transit categories. This estimate also includes what DVRPC forecasts as the need for county and local roadways eligible for federal aid. These needs are shown in Y-O-E dollars. In order to arrive at Y-O-E dollars for the needs assessment, DVRPC applied a four percent rate of inflation to the midyear in each funding period. The midyears are 2013 for the first funding period, 2021 for the second, and 2031 for the third.

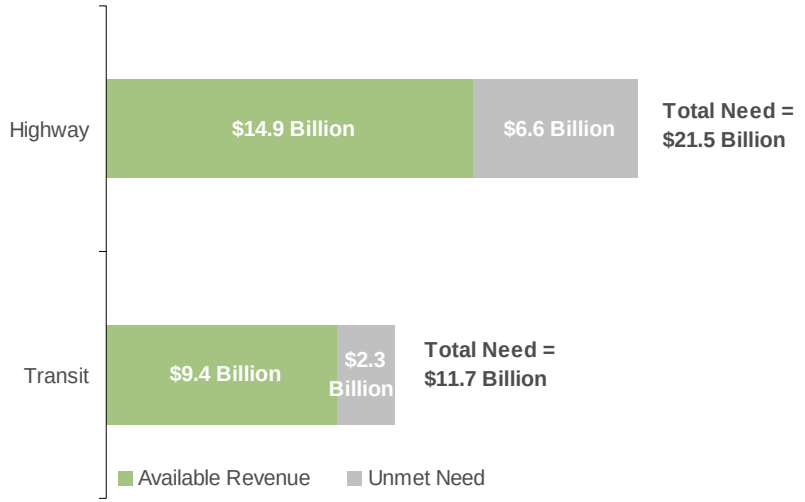
Total highway need for the New Jersey subregion in Y-O-E dollars is estimated to be about $21.5 billion. Total transit need for the New Jersey subregion over the life of the *Connections* Plan is estimated to be $11.7 billion. The figure on the following page illustrates the region's funding deficit by mode. On the highway side, there is a total estimated funding deficit of $6.6 billion over the life of the Plan. Only about 69 percent of the total need can be funded. On the transit side, there is a total funding deficit of about $2.3 billion over the life of the Plan. Only about 80 percent of the total identified need can be funded. The total funding deficit in the New Jersey subregion, with limited new capacity, is estimated at $9 billion over the life of the *Connections* Plan. This funding deficit estimate is based on primarily maintaining and repairing the subregion's transportation infrastructure with limited, focused new capacity investment.

New Jersey Subregion Total Expenditure Need (In Billions of Y-O-E $s)

Mode	Subcategory	2010-2015	2016-2025	2026-2035	Total
Highway	H1. Pavement Recon./Rehab./Resurf./Rest.	$ 0.98 B	$ 2.33 B	$ 3.23 B	**$ 6.54 B**
	H2. Bridge Replacement and Restoration	$ 1.26 B	$ 2.86 B	$ 4.20 B	**$ 8.32 B**
	H3. Operational Improvements	$ 0.32 B	$ 0.74 B	$ 1.10 B	**$ 2.16 B**
	H4. ITS and Signal	$ 0.08 B	$ 0.25 B	$ 0.43 B	**$ 0.75 B**
	H5. Highway New Capacity	$ 0.43 B	$ 0.81 B	$ 1.19 B	**$ 2.44 B**
	H6. Bicycle and Pedestrian	$ 0.05 B	$ 0.27 B	$ 0.56 B	**$ 0.89 B**
	H7. Other	$ 0.06 B	$ 0.15 B	$ 0.22 B	**$ 0.43 B**
	Highway Subtotal	**$ 3.19 B**	**$ 7.40 B**	**$ 10.93 B**	$ 21.52 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	$ 0.11 B	$ 0.25 B	$ 0.37 B	**$ 0.72 B**
	T2. Vehicle Rehabilitation and Replacement	$ 0.76 B	$ 1.73 B	$ 2.55 B	**$ 5.04 B**
	T3. Station Enhancements	$ 0.14 B	$ 0.33 B	$ 0.48 B	**$ 0.95 B**
	T4. System and Operational Improvements	$ 0.02 B	$ 0.05 B	$ 0.07 B	**$ 0.14 B**
	T5. Transit New Capacity	-	$ 1.58 B	$ 2.07 B	**$ 3.65 B**
	T6. Other	$ 0.39 B	$ 0.49 B	$ 0.31 B	**$ 1.19 B**
	Transit Subtotal	**$ 1.42 B**	**$ 4.41 B**	**$ 5.86 B**	$ 11.69 B
NJ Subregion Total		**$ 4.61 B**	**$ 11.82 B**	**$ 16.78 B**	$ 33.21 B

Totals may not add up due to up rounding.
Source: DVRPC 2009

New Jersey Subregion Funding Deficit (In Billions of Y-O-E $s)



Source: DVRPC 2009

DVRPC conducted a freight rail needs assessment for the Greater Philadelphia region. These needs are project based, and more information can be found in DVRPC's *Long-Range Vision for Freight* report. Project examples include new main tracks, additional vertical clearance for double stacking containers, sidings, yards, wyes, highway grade separated crossings, and track reconstruction. Since there are no federal formula funds specified in the existing SAFETEA-LU authorization for freight rail projects, these needs do not have revenue allocated to them. Individual projects are eligible for CMAQ and other grant funding opportunities. DVRPC fully supports improvements to the region's freight rail network.

Freight Rail Needs Assessment (In Millions of Y-O-E $s)

Subregion	2010-15	2016-25	2026-2035	Total
Pennsylvania	$ 68.2	$ 175.7	$ 2,399.4	$ 2,643.3
New Jersey	$ 5.8	$ 64.0	$ 489.4	$ 559.2
Total	**$ 74.0**	**$ 239.7**	**$ 2,888.8**	**$ 3,202.5**

Source: DVRPC 2009

Allocating Plan Revenues to Plan Funding Categories

DVRPC worked with the long-range plan subcommittees to identify a target revenue allocation for each of the funding categories based on the needs assessment and regional policies. Both the Pennsylvania and New Jersey long-range plan subcommittees agreed to continue the funding cap of 10 percent of highway revenues for new highway capacity projects. This is based on a policy to limit new highway capacity in the region and also the need to direct as much funding as possible toward the rebuilding and maintenance of the existing system. Even if all anticipated Plan revenues were directed toward maintaining the roads (category H1), replacing bridges (category H2), rebuilding the rail infrastructure (category T1), and replacing and renovating transit vehicles (category T2), there would not be enough money to address the identified need. Furthermore, the region would not have funding for any other types of improvements to address congestion, safety, or mobility.

Together, the pavement reconstruction (H1) and bridge replacement (H2) categories comprise over 72.5 percent of total highway expenditures in Pennsylvania and 71.5 percent in New Jersey. In Pennsylvania, the rail infrastructure replacement (T1) and vehicle replacement (T2) categories account for 60 percent of transit revenues; and in New Jersey, they account for 54 percent of transit expenditures. A higher percentage was allocated in Pennsylvania because of the larger, and older, system on that side of the river. These amounts signify what regional stakeholders agreed represented a prioritization of rebuilding and maintaining the system, but also addressed the need to improve the system through projects such as traffic signal modernization, ITS and other operational improvements, and multimodal enhancements to the transportation network. These investments reflect the prioritization for both the highway and transit network of rebuilding the system, followed by improving the operation of the existing system, and then expanding the system. FTA's New Start and Small Start funding is not allocated by this formula. The following figures identify the agreed upon

Pennsylvania Subregion Target Funding Allocation (In Billions of Y-O-E $s)

Mode	Plan Funding Category	Target Funding Allocation	Allocated Revenue (by Category)	TIP and MRP Programmed Expenditures [1]	Balance to be Programmed[2]
Highway	H1. Pavement Recon./Rehab./Resurf./Rest.	30.0%	$ 6.82 B	$ 3.20 B	$ 3.62 B
	H2. Bridge Replacement and Restoration	42.5%	$ 9.64 B	$ 4.84 B	$ 4.80 B
	H3. Operational Improvements	8.0%	$ 1.85 B	$ 1.50 B	$ 0.35 B
	H4. ITS and Signal	6.0%	$ 1.35 B	$ 0.32 B	$ 1.02 B
	H5. Highway New Capacity [3]	10.0%	$ 2.23 B	$ 1.87 B	$ 0.36 B
	H6. Bicycle and Pedestrian	1.75%	$ 0.40 B	$ 0.10 B	$ 0.30 B
	H7. Other	1.75%	$ 0.36 B	$ 0.03 B	$ 0.34 B
	Subtotal	**100.0%**	**$ 22.65 B**	**$ 11.87 B**	**$ 10.79 B**
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	22.0%	$ 3.94 B	$ 1.25 B	$ 2.70 B
	T2. Vehicle Rehabilitation and Replacement	38.0%	$ 6.82 B	$ 1.06 B	$ 5.77 B
	T3. Station Enhancements	17.0%	$ 2.99 B	$ 0.51 B	$ 2.48 B
	T4. System and Operational Improvements	5.0%	$ 0.90 B	$ 0.00 B	$ 0.90 B
	T5. Transit New Capacity [4]	9.3%	$ 0.46 B	$ 1.65 B	$ 0.02 B
	New Starts/Small Starts Funding [5]	-	$ 1.21 B		
	T6. Other	8.7%	$ 1.57 B	$ 0.54 B	$ 1.03 B
	Subtotal	**100%**	**$ 17.90 B**	**$ 5.01 B**	**$ 12.89 B**
PA Subregion Total		100%	$ 40.55 B	$ 16.87 B	$ 23.68 B

1. Programmed expenditure is the sum of all funding identified in the 2009-2012 DVRPC TIP and the *Connections* Plan's major regional projects.
2. Balance is remaining funding that has not been programmed in the TIP or for major regional projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.
3. Includes new capacity component of major regional projects and minor new capacity projects. Remaining Balance to be Programmed is reserved for future minor new capacity projects only.
4. Represents nonfederal only and does not include discretionary grants for transit New Starts or Small Starts projects.
5. Represents discretionary federal grant amount for New Starts and Small Starts projects.

Totals may not add up due to up rounding.
Source: DVRPC 2009

New Jersey Subregion Target Funding Allocation (In Billions of Y-O-E $s)

Mode	Plan Funding Category	Target Funding Allocation	Allocated Revenue (by Category)	TIP and MRP Programmed Expenditures [1]	Balance to be Programmed[2]
Highway	H1. Pavement Recon./Rehab./Resurf./Rest.	31.5%	$ 4.69 B	$ 0.97 B	$ 3.72 B
	H2. Bridge Replacement and Restoration	40.0%	$ 5.95 B	$ 0.28 B	$ 5.67 B
	H3. Operational Improvements	11.0%	$ 1.65 B	$ 1.14 B	$ 0.51 B
	H4. ITS and Signal	3.0%	$ 0.45 B	$ 0.35 B	$ 0.09 B
	H5. Highway New Capacity [3]	10.0%	$ 1.49 B	$ 1.33 B	$ 0.16 B
	H6. Bicycle and Pedestrian	1.5%	$ 0.22 B	$ 0.02 B	$ 0.20 B
	H7. Other	3.0%	$ 0.45 B	$ 0.10 B	$ 0.34 B
	Subtotal	**100.0%**	**$ 14.88 B**	**$ 4.19 B**	**$ 10.69 B**
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	7.5%	$ 0.78 B	$ 0.06 B	$ 0.72 B
	T2. Vehicle Rehabilitation and Replacement	46.5%	$ 4.33 B	$ 0.88 B	$ 3.45 B
	T3. Station Enhancements	10.0%	$ 0.95 B	$ 0.06 B	$ 0.89 B
	T4. System and Operational Improvements	1.5%	$ 0.14 B	$ 0.01 B	$ 0.13 B
	T5. Transit New Capacity [4]	25.0%	$ 1.13 B	$ 2.33 B	$ 0.02 B
	New Starts/Small Starts Funding [5]	-	$ 1.21 B		
	T6. Other	9.5%	$ 0.80 B	$ 0.20 B	$ 0.61 B
	Subtotal	**100.0%**	**$ 9.35 B**	**$ 3.54 B**	**$ 5.81 B**
NJ Subregion Total		100.0%	$ 24.23 B	$ 7.73 B	$ 16.50 B

1. Programmed expenditure is the sum of all funding identified in the 2009-2012 DVRPC TIP and the *Connections* Plan's major regional projects.
2. Balance is remaining funding that has not been programmed in the TIP or for major regional projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.
3. Includes new capacity component of major regional projects and minor new capacity projects. Remaining Balance to be Programmed is reserved for future minor new capacity projects only.
4. Represents nonfederal only and does not include discretionary grants for transit New Starts or Small Starts projects.
5. Represents discretionary federal grant amount for New Starts and Small Starts projects.

Totals may not add up due to up rounding.
Source: DVRPC 2009

target allocations for each funding category, the resulting revenue over the life of the Plan, and how much revenue has been programmed in each funding category for the Plan's major regional projects and existing TIP projects. The final column in this table, 'Balance to be Programmed,' includes funding for projects as they are identified and prioritized to be funded in future TIP development cycles.

I-95 illustrates the difficult task of addressing the rebuilding of our infrastructure in a fiscally constrained environment, while still allocating some funding for system improvements. Rebuilding I-95 from Center City to the Delaware State Line is a major project that will need to be initiated during the life of the *Connections* Plan. Much of this segment of I-95 is a viaduct bridge structure, and many sections will be more than 65 years old by 2035, well beyond their 50-year useful design life. Strictly rebuilding the portion of this facility in-kind between Queen Street and Broad Street in South Philadelphia is estimated to cost $4 billion in 2009 dollars, which if scheduled to be built in the final period of the financial plan, will cost an estimated $11.4 billion in Y-O-E dollars. This single project would require more than the region's total allocation for bridge reconstruction (H2) over the life of the Plan and would amount to 50 percent of the Pennsylvania subregion's reasonably expected highway revenue. This particular reconstruction need becomes even more difficult to fund in the face of the need to rebuild the rest of I-95, from Broad Street south to the Girard Point Bridge, then through Delaware County to the state line. As a result of the high cost, a fiscally constrained Plan is able to accommodate only the first segment of this section of I-95 from Queen Street to Washington Avenue in Philadelphia (LRP ID #100). This initial phase gets the project moving and alerts DVRPC's state and federal partners of the urgent need that this project entails. Clearly, the key issue in successfully delivering this project is determining how to fund it as part of a multiparty, collaborative effort.

The Federal Interstate Maintenance System and the Pennsylvania State Interstate Management Program (IMP) were set up to provide funding for maintaining the interstate system. In Pennsylvania, the sum of federal and state IMP funds average $435 million per year from 2009 to 2012. The DVRPC Pennsylvania subregion can reasonably expect to receive approximately 32 percent of these funds, or an average of $132 million per year. Over the life of the Plan, the Pennsylvania region expects $5.3 billion (in Y-O-E dollars) of IMP funds (this is one source of the $22.7 billion in Pennsylvania highway funds identified in the financial plan). If 50 percent of the region's IMP funds ($2.65 billion) are allocated to rebuilding I-95's northern Philadelphia section (LRP ID #65), and if the region contributes $2 billion for the Queen Street to Broad Street section of I-95, there would be less than $1 billion of IMP funds left for rebuilding the rest of the interstate system in the region, including the remaining southern portion of I-95 in Philadelphia and Delaware County and a more northern section in Bucks County (which is included in the Plan).

Major Regional Project Evaluation and Selection

A primary objective of the DVRPC long-range planning process is that transportation investments should help further the goals of the Plan. The *Connections* Plan has four key principles: Invest in Livable Communities; Manage Growth and Protect Resources; Build an Energy-Efficient Economy; and Establish a Multimodal Transportation System. These four principles form a framework for the goals of the Plan. Under this context, the individual goals of rebuilding the existing system, reducing congestion, improving safety, increasing mobility options for people and goods, and identifying additional funding all further the principle of establishing a modern, multimodal transportation network.

Major regional projects are large-scale projects that will have a significant impact on regional travel in the region and primarily consist of new highway capacity projects or new fixed-guideway transit routes. Potential major regional projects are screened and then evaluated to assess whether they meet key objectives of the Plan. The first step in the analysis is a screening

Highway Project Criteria

- *Does the Project Serve the Region's Identified Population and Employment Centers?* – Highway capacity expansions should enforce existing or planned developed places as defined by the *Connections* Land Use Plan map designated centers. Exit ramps and access points should serve the centers.
- *Are There Significant Environmental Issues That Will Be Impacted by a Project as Measured by DVRPC's Environmental Screening Tool (EST)?* – The EST evaluates the impacts of transportation projects on environmental features and assigns a quantitative value to those impacts.
- *Is the Project Located in a CMP Priority Subcorridor?* – With limited available funding, it is important to identify those corridors that have the greatest significance for carrying regional travel. This criterion elevates those congested corridors with the greatest impact on regional travel.
- *Is the Facility an Intermodal NHS or NHS Connector?* – The National Highway System (NHS) consists of the major highway facilities in the region and represents the roads that are crucial to the movement of people and goods. The NHS is also a key component for the movement of freight. Improvements to these facilities, particularly the NHS Connectors, have a significant impact on improving goods movement in the region.
- *What is the Cost per Vehicle Mile Traveled on the Facility?* – Determined by dividing the project cost estimate by current-year traffic volumes and then multiplied by facility length. Project cost should reflect the proportion of the total construction cost attributable to new capacity. This criteria allows comparison of projects of vastly different sizes.
- *What Level of Support is there for the Project?* – Does the project have a broad base of support and is there a long-standing regional consensus for it.

process to determine if a proposed project meets the key criteria of investing in areas that are currently developed or have been identified as areas appropriate for development over the life of the Plan. Highway projects have an additional screening criterion of being consistent with the region's Congestion Management Process (CMP). Consistency is determined by whether the subcorridor where a potential new highway capacity project is located has been identified in the CMP as appropriate for additional capacity. If a project fails the screening process, it is not considered for inclusion in the Plan. Projects that pass the screening are then evaluated further by a series of factors that are described in the figure on the following page.

The Pennsylvania and New Jersey long-range plan subcommittees were provided with the project evaluation summaries for each of the major regional projects for use during their deliberations of which projects would be included in the fiscally constrained Plan. The final step in developing the financial plan was to decide which major regional projects to fund using the allocated highway and transit new capacity revenue in Pennsylvania and New Jersey. It is important to note that major regional project costs are broken out over several funding categories since their scope may involve reconstructing the road, replacing or rehabilitating bridges, or operational-type improvements, in addition to whatever road widening component is included. Costs for each component are broken out and assigned to the proper funding category for each of the major regional projects.

The following tables and map present the major regional projects that are funded in the *Connections* Plan. The first set of tables show the highway, transit and externally funded projects in Pennsylvania. The following set shows the highway, transit and externally funded projects in New Jersey. The highway and transit tables represent the fiscally constrained set of major regional projects in the DVRPC region. The 2035 Major Regional Transportation Projects Map locates each project in these six tables

geographically in the region. The LRP ID number serves as the link between each project listed in the tables and shown on the map.

The Highway Major Regional Projects tables show each facility's name, scope, and location by county. The 'timing' columns indicate the period during which the project will be constructed. The 'other funding' columns indicate additional funding from nonfederal sources, such as local or county, ARRA of 2009 expenditure, or other external sources that are generally toll revenues from regional authorities or developer contributions. The other funds are shown in 2009 dollars as provided by the sponsoring agency or authority. Each project may have funding in several categories. These include pavement reconstruction or rehabilitation (H1), bridge replacement or rehabilitation (H2), operational improvements (H3), or new capacity (H5). The columns related to each of these categories indicate the estimated expenditure in Y-O-E dollars by period. Since new capacity is capped at 10 percent of available revenue, new capacity costs are totaled in the second-to-last column. The total federally funded project cost for all categories in Y-O-E dollars is summed in the final column.

The Transit Major Regional Project tables are similar to the highway in that they show the facility name, scope, location, and funding period timing. However, each of these projects is considered to be entirely new capacity (T5). As a result, only this category is shown in the table, with the final column summing the anticipated total project cost in Y-O-E dollars.

A third table for each subregion shows the Externally Funded Major Regional Projects (both highway and transit) by facility name, scope, timing, location, and estimated project cost in 2009 dollars as provided by the sponsoring agency or authority. These projects do not receive any federal funding, and thus do not count against the Plan's anticipated revenues.

The major regional projects listed in the following tables represent only a small number of the total projects that will be funded over the life of the Plan. As already noted, only 10 percent of available highway funding is allocated

Transit Project Criteria

- *Does the Project Serve Areas that Will Support a High Level of Transit Service as Measured by DVRPC's Transit Score Index?* – Network expansions should enforce existing or planned developed places. The Transit Score Index indicates whether a project has the requisite density to be successful. Because the region's centers have a high degree of density, this measure will also serve as a proxy for serving centers of place. Analysis will be based on the percentage of the route, with a half-mile buffer, that serves 2035 census tracts ranked as either Medium-High or High using the Transit Score Index.
- *Does the Project Serve Environmental Justice Communities with Additional Transit Needs as Identified by DVRPC's Degrees of Disadvantage (DOD) Analysis?* – A census tract with twice the regional average in elderly, disabled, poverty, or female head of household is the basis for each DOD.
- *Are there Significant Environmental Issues that Will Be Impacted by a Project as Measured by DVRPC's Environmental Screening Tool (EST)?* – The EST evaluates the impacts of transportation projects on environmental features and assigns a quantitative value to those impacts. A proposed project will not be analyzed if it utilizes an existing rail line that has been deactivated or an active freight line, since the environmental impact will be minimal compared to a brand new alignment.
- *What is the Project Capital Cost per Passenger?* – Project capital cost divided by projected year-of-maturity annual ridership. This criteria allows comparison of projects of different sizes and lengths.
- *What is the Project Status?* – Has the project been studied, as defined by FTA? A more detailed level of study results in more robust ridership and cost estimates, as well as an examination of various alternative routings.
- *What Level of Support is there for the Project?* – Does the project have a broad base of support and is there a long-standing regional consensus for it? Operating agency support is important because it will ultimately have to provide operational funding for the project once it is completed.

for new highway capacity. The bulk of the highway funding will go toward pavement and bridge maintenance and repair. Other funding will go to operational improvements, bicycle and pedestrian projects, or other categories. Similarly, only new fixed-guideway projects are included in the set of major regional transit projects that are shown in the Plan. The majority of transit funding will go toward replacing and rehabilitating transit vehicles, rebuilding the transit infrastructure, such as tracks and stations, and operational improvements, such as fare modernization.

The full listing of projects that will be funded through the Plan is not shown here for practicality. A listing of thousands of repair and maintenance projects over the life of the Plan would fill volumes. Secondly, the exact timing and need for projects on the region's numerous road segments, bridges, transit vehicles, and stations is difficult to identify over a 26-year period. Money has been set aside for each of these different types of projects in the financial plan in order to meet these needs to the best of our abilities to do so. In the short term, the Transportation Improvement Program (TIP) lists the projects being funded through the Plan funding categories. Future iterations of the TIP will identify the priority projects to fund at that time.

A sampling of some of the strategic transportation investments included in the Plan shows how transportation projects can support land use, environmental, and economic developments goals. A number of the major regional highway projects complete gaps in the existing system. The new I-95 and Pennsylvania Turnpike Interchange (LRP ID #35) addresses the missing movement between these two critical elements of the region's highway system. The Adams Avenue Connector (LRP ID #68) provides connection between I-95 and the Betsy Ross Bridge, and invests in one of the region's core cities. Similarly, in New Jersey, the I-295 and I-76/NJ 42 direct connection (LRP ID #77) and missing movements (LRP ID #72) projects complete this critical interchange and improve the functionality and safety of the highway network. Each of these will help to facilitate goods movement within and through the region.

Other new highway capacity projects improve the region's economic competitiveness, while supporting Plan goals. The Penrose Avenue/26th Street (LRP ID #67) access road improves mobility to the Navy Yard, which is one of the region's largest brownfield redevelopment areas. Likewise, the North Delaware Avenue extension (LRP ID #66) provides access to planned residential and recreational facilities. Similarly, the Lafayette Street extension (LRP ID #55) will provide direct access from the Pennsylvania Turnpike to Norristown, one of the region's town centers.

There are several projects on US 202, which has evolved into an outer beltway around the region. Several widening projects (LRP ID #s 43 and 56) on this route will help to alleviate some of the region's worst congestion, while addressing multimodalism through an array of CMP commitments for pedestrian, bicycle, and transit improvements. Other projects, such as the grade-separated interchange on Country Road 533 in Mercer County (LRP ID #99), will support transit improvements, in this case, the Route 1 Bus Rapid Transit project (LRP ID 'S').

While it does not provide new capacity, the conversion of the NJ 29 Freeway (LRP ID #31) into an urban boulevard is a project that will provide many benefits to the residents of another of the region's core cities (Trenton). This project will improve access to the Delaware River, increase safety, and promote redevelopment.

Pennsylvania Highway Major Regional Projects

LRP ID	Facility	Project Scope	Location					Timing			Other Funding (in MM 2009 $s)			H1. Pavement Recon. / Rehab. / Resurf./ Cost (in MM YOE $s)	H2. Bridge Rep./ Rest Cost (in MM YOE $s)	H3. Operational Improvement Cost (in MM YOE $s)	H5. Highway New Capacity Cost (in MM YOE $s)			Total H5 Cost (in MM YOE $s)	Total Project Federal Funding Via DVRPC (in MM YOE $s)
			Bucks	Chester	Delaware	Montgomery	Philadelphia	2010-2015	2016-2025	2026-2035	County	ARRA	External				2010-2015	2016-2025	2026-2035		
33	US 202 (Sec. 700)	New 2 Lane Parkway and Intersection Improvements from Montgomeryville to Doylestown	X			X		X			$ -	$ -	$ -	$ -	$ -		$ 122.8	$ -	$ -	$ 122.8	$ 122.8
34	County Line Road	Widen and Reconstruct from PA 309 to PA 611	X			X		X	X	X	$ -	$ -	$ -	$ 43.2	$ -	$ -	$ 3.8	$ 5.9	$ 8.8	$ 18.5	$ 61.8
35	I-95 at PA Turnpike	New Interchange at I-276 (PA Turnpike); Widen PA Turnpike from US 1 to New Jersey	X					X	X		$ -	$ -	$625.2	$ 78.6	$ -	$ -	$ 167.1	$ -	$ -	$ 167.1	$ 245.7
37	US 1	Reconstruct from I-276 (PA Turnpike) to NJ State Line; Widen from PA Turnpike to PA 413; Interchange Improvements	X					X	X		$ -	$ -	$ -	$ 108.1	$ -	$ -	$ -	$ 36.0	$ -	$ 36.0	$ 144.1
39	US 202 (Section 100)	Widen from West Chester to Delaware State Line		X	X			X	X		$ -	$ -	$ -	$ 275.0	$ -	$ -	$ 4.7	$178.7	$ -	$ 183.4	$ 458.4
41	French Creek Parkway	Construct New Road between PA 23 to PA 29		X				X	X		$ -	$ -	$ -	$ -	$ -	$ -	$ 27.7	$ 14.5	$ -	$ 42.1	$ 42.1
42	PA 100	Widen from Shoen Road to Gordon Road		X				X			$ -	$ -	$ -	$ 6.3	$ -	$ -	$ 10.1	$ -	$ -	$ 10.1	$ 16.4
43	US 202 (Section 300)	Widen and Reconstruct from PA 252 to US 30		X				X	X		$ -	$ -	$ -	$ 148.7	$ 13.3	$ -	$ 53.2	$ 2.5	$ -	$ 55.7	$ 217.7
46	US 30 Business	Widen US 30 Business to 5 Lanes from US 202 to Exton Mall		X				X	X		$ -	$ -	$ -	$ 6.7	$ -	$ -	$ 3.5	$ 3.3	$ -	$ 6.7	$ 13.4
48	US 30/Coatesville-Downingtown Bypass	Reconstruct from Exton Bypass to PA 10; Interchange Improvements at Airport Rd. and PA 113; Widen from Business 30/Exton Bypass to Reeceville Rd.		X				X	X	X	$ -	$ -	$ -	$ 718.8	$ -	$ -	$ 6.5	$143.8	$ 60.9	$ 211.1	$ 929.9
50	US 322	Widen and Reconstruct from US 1 to I-95				X		X	X		$ -	$ -	$ -	$ 197.9	$ -	$ -	$ 20.6	$106.3	$ -	$ 126.9	$ 324.8
54	I-76 and Henderson Rd	Widen and Reconstruct Henderson Rd./South Gulph Rd. from Monroe Boulevard to I-76 Gulph Mills Interchange; Construct New Ramps to I-76				X		X	X	X	$ -	$ 14.5	$ -	$ 15.6	$ -	$ -	$ 4.8	$ 10.3	$ 0.5	$ 15.6	$ 31.2
55	Lafayette Street	Roadway Extension from Barbadoes St. to Conshohocken Rd.; New PA Turnpike Interchange; Bridge Improvements				X		X	X		$ 12.0	$ -	$ 63.0	$ 30.3	$ -	$ -	$ 22.9	$ 7.4	$ -	$ 30.3	$ 60.6
56	US 202 (Section 600)	Widen and Reconstruct from Johnson Highway to PA 309				X		X	X		$ -	$ -	$ -	$ 88.0	$ -	$ -	$ 0.2	$111.8	$ -	$ 112.0	$ 200.0
57	PA 309 Connector Road	Construct New Road from PA 309 to Sumneytown Pike; Phase II of Upgrades and Reconstruction	X			X		X	X		$ -	$ -	$ -	$ 15.1	$ -	$ -	$ 20.6	$ 24.6	$ -	$ 45.2	$ 60.3
65	I-95 Philadelphia (North)	Reconstruct from I-676 to Cottman Ave.; Interchange Improvements at I-676, Girard Ave., Allegheny Ave., Betsy Ross Bridge, Bridge St., and Cottman Ave. Interchanges					X	X	X	X	$ -	$ -	$ -	$ -	$ 237.2	$ 675.1	$ 22.1	$ 96.9	$143.5	$ 262.5	$ 3,750.4
66	North Delaware Ave.	Extend Arterial Roadway from Lewis St. to Bridge St.					X	X	X		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 32.5	$ -	$ 32.5	$ 32.5
67	Penrose Ave./26th St.	New Access Road to Navy Yard Business Center					X	X			$ -	$ -	$ -	$ -	$ -	$ -	$ 12.1	$ -	$ -	$ 12.1	$ 12.1
68	Adams Avenue Connector	Extend Roadway to New Ramps at I-95 and Aramingo Avenue					X	X			$ -	$ -	$ -	$ -	$ -	$ -	$ 11.7	$ -	$ -	$ 11.7	$ 11.7
95	US 422 and PA 363 Interchange (River Crossing)	Intersection/Interchange Improvements at US 422 and PA 363 Interchange				X		X			$ -	$ -	$ -	$ -	$ -	$ -	$ 14.0	$ -	$ -	$ 14.0	$ 14.0
96	US 422 Bridge and PA 23 Interchange (River Crossing)	Bridge Replacement and Widening over Schuykill River - existing bridge is 5 lanes, new bridge will have 6 lanes; Intersection/Interchange Improvements at US 422 and PA 23 Interchange				X		X	X		$ -	$ -	$ -	$ -	$ 62.7	$ 39.4	$ 15.7	$ 16.6	$ -	$ 32.3	$ 134.4
98	US 422 Mainline Widening (River Crossing)	Widen from 4 to 6 Lanes from US 202 to PA 363				X		X	X	X	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 24.0	$ 35.5	$ 59.6	$ 59.6
100	I-95 Philadelphia (South)	Reconstruct Viaducts from Queen St. to Washington Ave.					X			X	$ -	$ -	$ -	$ -	$ 651.0	$ -	$ -	$ -	$ -	$ -	$ 651.0

Source: DVRPC 2009

Pennsylvania Transit Major Regional Projects

LRP ID	Facility	Project Scope	Location					Timing			Other Funding (in MM 2009 $)			T5. Transit New Capacity Cost (in MM YOE $s)			
			Bucks	Chester	Delaware	Montgomery	Philadelphia	2010-2015	2016-2025	2026-2035	County	ARRA	External	2010-2015	2016-2025	2026-2035	Total Federal Funding Via DVRPC
H	R1 Regional Rail/Route 36	New R1 Station at Eastwick and Extension of Route 36 to New Eastwick Station					X	X	X		$ -	$ -	$ -	$ -	$ 17.3	$ -	$ 17.3
N	Quakertown Line	New Passenger Rail Line from Lansdale to Shelly	X			X		X	X		$ -	$ -	$ -	$ -	$ 199.1	$ -	$ 199.1
P	R3 Regional Rail Extension	Rail Line Extension from Elwyn to Wawa			X			X			$ -	$ -	$ -	$ 81.5	$ -	$ -	$ 81.5
Q	Norristown High Speed Line	Rail Line Extension from Hughes Park to King of Prussia Mall				X		X	X		$ -	$ -	$ -	$ -	$ 536.3	$ -	$ 536.3
V	Delaware Ave. Rail Line	New LRT Line Within Philadelphia					X		X		$ -	$ -	$ -	$ -	$ 756.5	$ -	$ 756.5
W	R5 Regional Rail Extension	Rail Line Extension from Thorndale to Atglen		X				X			$ -	$ -	$ -	$ 56.9	$ -	$ -	$ 56.9

Source: DVRPC 2009

Pennsylvania Externally Funded Major Regional Projects

LRP ID	Facility	Project Scope	Location					Timing			External Costs (in MM 2009 $s)
			Bucks	Chester	Delaware	Montgomery	Philadelphia	2010-2015	2016-2025	2026-2035	
32	I-476 (PA Turnpike Northeast Extension)	Widen to 6 Lanes from Lansdale to Quakertown	X			X			X		$ 665.0
36	I-95 at Scudders Falls Bridge	Widen I-95 from PA 332 to the River Bridge; Replace and Widen the River Bridge; Reconfigure the NJ 29 and I-95 Interchange and repave I-95 from PA 332 (Bear Tavern Road) to CR 579	X					X			$ 154.5*
40	I-76 (PA Turnpike)	Widen from Downingtown to Valley Forge		X		X			X		$ 300.0
47	I-76 (PA Turnpike)	Electronic Interchange at PA 29		X				X			$ 65.0
52	I-476 (PA Turnpike Northeast Extension)	Widen to 6 Lanes from Mid-County to Lansdale Interchanges				X		X			$ 295.0
M	Delaware River Tram	New Aerial Tram from Philadelphia to Camden					X		X		$ 27.5*
O	R6 Regional Rail Extension	Rail Line Extension from Norristown to Wyomissing, Berks County		X		X		X	X		$ 500.0

* Cost shown is for Pennsylvania portion only; total project cost is Pennsylvania portion plus New Jersey portion.
Source: DVRPC 2009

New Jersey Highway Major Regional Projects

LRP ID	Facility	Project Scope	Location				Timing			Other Funding (in MM 2009 $)			H1. Pavement Recon. / Rehab. / Resurf./ Rest. Cost (in MM YOE $s)	H2. Bridge Rep / Rest Cost (in MM YOE $s)	H3. Operational Improvement Cost (in MM YOE $s)	H5. Highway New Capacity Cost (in MM YOE $s)			Total H5 Cost	Total Project Federal Funding Via DVRPC (in MM YOE $s)
			Burlington	Camden	Gloucester	Mercer	2010-2015	2016-2025	2026-2035	County	ARRA	External				2010-2015	2016-2025	2026-2035		
24	NJ 73 & NJ 70 (Marlton Circle)	New Grade-Separated Interchange at Marlton Circle	X				X			$ -	$ -	$ -	$ -	$ -	$ -	$ 35.9	$ -	$ -	$ 35.9	$ 35.9
31	NJ 29	Convert NJ 29 to an Urban Boulevard from US 1 to Sullivan Way				X	X	X		$ -	$ -	$ -	$ 286.1	$ -	$ 59.2	$ -	$ -	$ -	$ -	$ 345.3
72	I-295 at NJ 38	Add Missing Movements to Interchange at NJ 38	X					X		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 190.4	$ -	$ 190.4	$ 190.4
73	NJ 73	Widen and Intersection Improvements in Vicinity of Fox Meadow Road	X				X	X		$ -	$ -	$ -	$ -	$ -	$ -	$ 20.8	$ -	$ -	$ 20.8	$ 20.8
75	I-295 at I-76/NJ 42	Add Missing Movements to Interchange at I-76/NJ 42		X	X		X	X		$ -	$ -	$ -	$ -	$ -	$ -	$ 81.5	$ 72.7	$ -	$ 154.2	$ 154.2
76	NJ 42 Freeway	Reconstruct from I-295 to AC Expressway; New Interchange at College Dr.		X	X		X	X		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 24.0	$ -	$ 24.0	$ 24.0
77	I-295 (Direct Connect)	Direct Connection of I-295 Through Interchange at I-76/NJ 42		X			X	X		$ 7.0	$ -	$ -	$ 459.2	$ -	$ 332.3	$ 106.9	$ 242.5	$ -	$ 349.4	$1,140.9
84	US 1 - Penns Neck Area	New Connector Road, Interchanges and Widening in Vicinity of Penns Neck				X		X		$ -	$ 18.0	$ -	$ -	$ -	$ -	$ -	$ 310.4	$ -	$ 310.4	$ 310.4
94	US 322 Mullica Hill Bypass	New Bypass in Vicinity of US 322 and NJ 45			X		X	X		$ -	$ -	$ -	$ -	$ -	$ -	$ 13.5	$ 3.2	$ -	$ 16.7	$ 16.7
99	CR 533	Grade Separate Interchange by Adding One Flying Express Lane in Each Direction on CR 533 over CR 638				X		X		$ -	$ 3.0	$ 2.0	$ -	$ -	$ -	$ -	$ 16.0	$ -	$ 16.0	$ 16.0

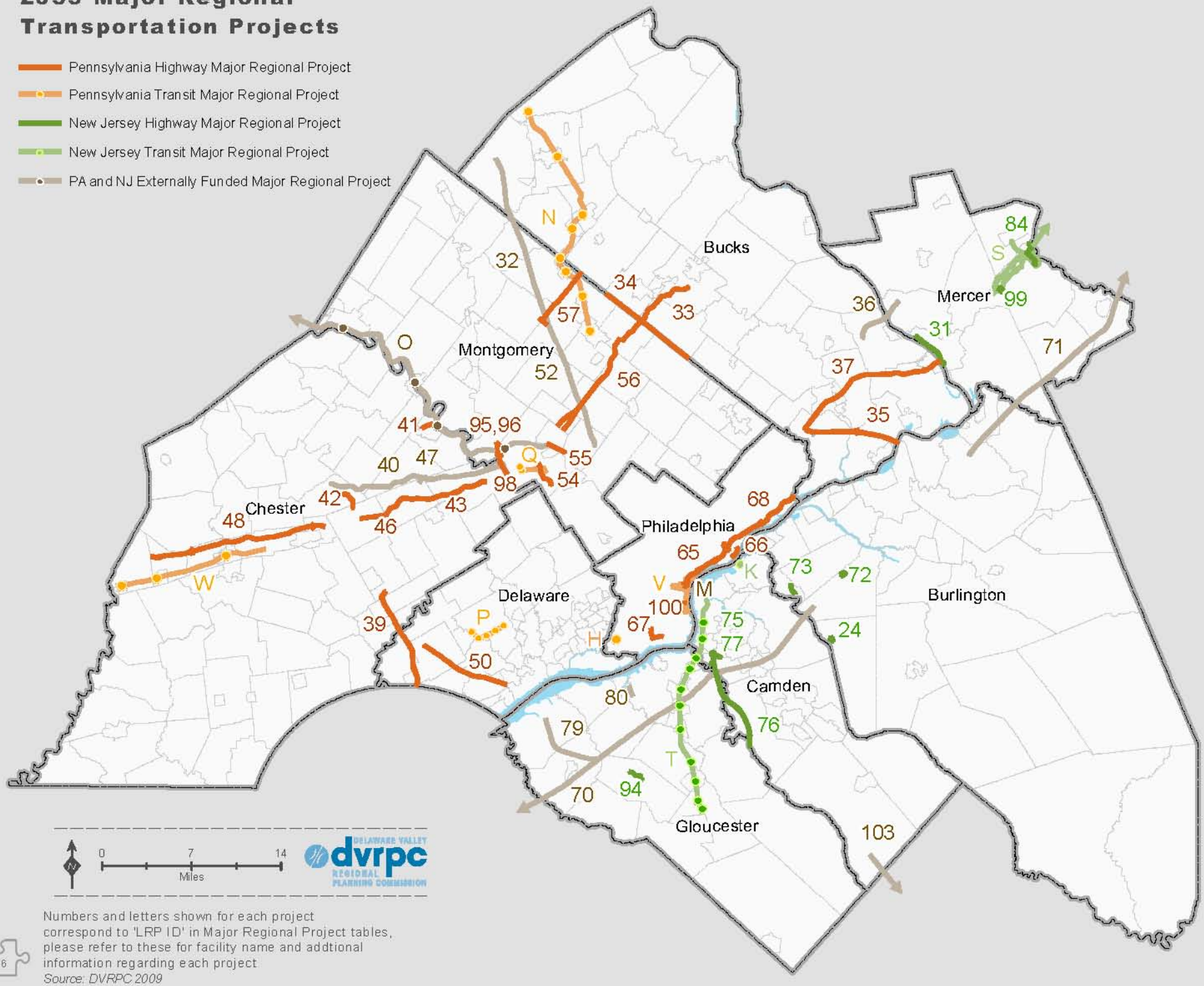
Source: DVRPC 2009

New Jersey Transit Major Regional Projects

LRP ID	Facility	Project Scope	Location				Timing			Other Funding (in MM 2009 $s)			T5. Transit New Capacity Cost (in MM YOE $s)			
			Burlington	Camden	Gloucester	Mercer	2010-2015	2016-2025	2026-2035	State	ARRA	External	2010-2015	2016-2025	2026-2035	Total Federal Funding Via DVRPC
K	Transfer Station	New Station for RiverLine and Atlantic City Rail Line at Pennsauken		X			X			$ -	$ 28.0	$ -	$ 14.0	$ -	$ -	$ 14.0
S	US 1 BRT	New Bus Rapid Transit Service in Central New Jersey along US 1 Corridor				X		X		$ -	$ -	$ -	$ -	$ 400.3	$ -	$ 400.3
T	Transit Line to Gloucester County	Construct New Transit Line from Camden to Gloucester County		X	X		X	X		$ 500.0	$ -	$ 260.0	$ 187.2	$ 1,729.1	$ -	$ 1,916 .3

Source: DVRPC 2009

2035 Major Regional Transportation Projects



Numbers and letters shown for each project correspond to 'LRP ID' in Major Regional Project tables, please refer to these for facility name and addtional information regarding each project

Source: DVRPC 2009

New Jersey Externally Funded Major Regional Projects

LRP ID	Facility	Project Scope	Location				Timing			External Costs (in MM 2009 $s)
			Burlington	Camden	Gloucester	Mercer	2010-2015	2016-2025	2026-2035	
36	I-95 at Scudders Falls Bridge	Widen I-95 from PA 332 to the River Bridge; Replace and Widen the River Bridge; Reconfigure the NJ 29 and I-95 Interchange and repave I-95 from PA 332 (Bear Tavern Rd) to CR 579				X	X			$ 154.5*
70	New Jersey Turnpike	Widen from Exit 4 to Delaware Memorial Bridge	X	X	X				X	$ 310.0
71	New Jersey Turnpike	Widen from Exit 6 to Exit 9	X			X	X			$ 2,700.0
79	US 322	Widen from US 130 to NJ Turnpike			X			X	X	$ 40.0
80	Paulsboro Bridge	New Bridge and Roadway Improvements from I-295 to Paulsboro BP site			X		X	X		$ 40.0
103	Atlantic City Expressway	Widen from 5 Lanes to 6 Lanes from Route 73 to Atlantic County		X			X			$ 131.8
M	Delaware River Tram	New Aerial Tram from Philadelphia to Camden		X				X		$ 27.5*

* Cost shown is for New Jersey portion only; total project cost is New Jersey portion plus Pennsylvania portion.
Source: DVRPC 2009

The Plan also includes a number of new fixed-guideway transit projects. The R3 extension to Wawa (LRP ID 'P') and the R5 extension to Atglen (LRP ID 'W') will extend existing lines. The Norristown High Speed Line (LRP ID 'Q') and US 1 BRT (LRP ID 'S') will provide service to the high-growth suburban centers of King of Prussia and the Princeton/US 1 Corridor, respectively. The Delaware Avenue Rail Line (LRP ID 'V') improves service in the metropolitan center, while in New Jersey the transit line to Gloucester County (LRP ID 'T') links a number of town centers to one of the region's core cities (Camden) and the larger transit network. The Quakertown Line (LRP ID 'N') and the R6 Extension (LRP ID 'O') will provide new rail service along two burgeoning, congested suburban corridors.

Transportation Improvement Program

Inclusion in the *Connections* Plan means that a major regional project has been identified as a regional priority for funding and is part of the region's financial plan. The Transportation Improvement Program (TIP) is the short-term implementation of the long-range financial plan. The TIP is the regionally agreed-upon list of priority projects to be advanced during a three- to four-year timeframe. The TIP is authorization to seek funding. A project's presence in the TIP represents a critical step in the authorization of funding for a project. It does not, however, represent a commitment of funds, an obligation to fund, or a grant of funds.

As required by federal law, the TIP document must list all projects that intend to use federal funds, along with nonfederally funded projects that are regionally significant. The TIP also includes all other state-funded capital projects. The projects are multimodal; that is, they include bicycle, pedestrian, freight-related, and innovative air quality projects, as well as the more traditional highway and transit projects.

Regionally significant projects must be drawn from the region's Long-Range Plan, and all projects in the TIP must help implement the goals of the Plan. The Plan is the document that helps direct transportation and land use decisions over a long horizon. The TIP represents the implementation of recommendations from the Plan into a short-term program of improvements. As each subsequent iteration of the TIP is developed, it will draw down on the balance to be programmed of the respective Plan funding category. TIP projects that are not listed as major regional projects in the Plan will still be considered to be consistent with the Plan because they further its goals of rebuilding, maintaining, and improving the operation of the existing system or further alternative modes of transportation, such as transit or bicycle and pedestrian facilities.

Air Quality Conformity

The Environmental Protection Agency (EPA) has established health-based standards for six criteria air pollutants, referred to as the National Ambient Air Quality Standards (NAAQS). Air Quality in the DVRPC region does not meet the standards for two of these pollutants: ground level ozone and fine particulate matter ($PM_{2.5}$).

Since the DVRPC region does not meet the standards for ozone and $PM_{2.5}$, the Clean Air Act requires DVRPC to demonstrate that the transportation projects contained in the TIPs and Plan do not make the region's air quality worse or impede the region's progress toward meeting the NAAQS. The process of this demonstration is referred to as transportation conformity.

DVRPC demonstrates transportation conformity by using a transportation demand model to estimate the motor vehicle emissions from all of the major regional projects in the TIPs and Plan and comparing those emissions against budgets or limits established by the states. This process is conducted in close coordination with an interagency consultation group, which is comprised of state and federal regulatory environmental, transportation, and transit agencies. The consultation group reviews the list of transportation projects, agrees on the planning assumptions, such as population and employment forecasts, and agrees on the emission model inputs before the conformity analysis is conducted.

DVRPC has successfully demonstrated the transportation conformity of the *Connections* Plan and Pennsylvania and New Jersey TIPs in accordance with the corresponding state implementation plans and Clean Air Act requirements.

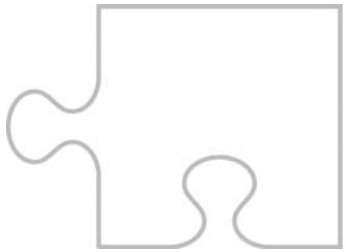
Meeting the Goals of the Plan

The transportation investments outlined in the *Connections* Plan help further the regional transportation, land use, environmental, and economic competitiveness goals contained in the Plan. A top priority in the region is the rebuilding and maintenance of the transportation infrastructure, and almost 75 percent of projected available funding will be allocated to rebuild the highway and transit system. Furthermore, transit, bicycle, and pedestrian projects account for nearly half of the overall funding in the Plan. This reflects the goal of constructing a multimodal transportation network. The next largest amount of funding is allocated toward improving the operation of the system. Finally, new highway capacity funding is capped at 10 percent of anticipated highway revenue, and no new projects are identified beyond what is included in the current TIP. This funding follows the prioritization of needs for both the highway and transit systems that were outlined as strategic policies.

The major regional projects contained in the Plan were screened to ensure that they are located in areas that were appropriate for development and are consistent with the region's Congestion Management Process, which identifies appropriate corridors for additional highway capacity. In order to meet fiscal constraint, several projects that were included in the set of major regional projects in the *Destination 2030* Plan were right-sized to reduce project scope and cost.

CHAPTER 6

Closing the Funding Gap



The region receives transportation capital funding from various levels of federal, state, and local government. Current funding levels are not nearly enough to meet the region's transportation needs. DVRPC's transportation infrastructure needs assessment found a minimum regional funding gap of $45.4 billion over the 26-year life of the *Connections* Plan just in order to achieve and maintain a state of good repair for existing infrastructure with limited new capacity expansion. Failure to maintain and improve the transportation system reduces the region's economic competitiveness, as it becomes a less attractive location for business investment; harms the environment due to increased congestion; causes more vehicular damage due to poor road conditions; and increases vehicular crashes due to less-safe driving conditions.

Roads in poor condition damage tires and suspension systems, increase fuel consumption, and increase travel time. The American Association of State Highway and Transportation Officials' (AASHTO) *Rough Roads Ahead* report estimates that poor road conditions in the Greater Philadelphia region cost the average driver $525 per year in additional vehicle expenses. This leads to what is essentially a double payment in road repair costs, as drivers must pay for the damage to their vehicles caused by the road conditions, and then again to repair the road. Meanwhile, ongoing budget shortfalls mean that only the highest priority projects can be completed, causing departments of transportation to be more reactive than proactive in roadway maintenance. Keeping roads in a good state of repair extends useful life and lowers the expenditure needed over time. This is the more cost-effective course of action, as the basic maintenance involved in keeping a road in good condition costs anywhere from one-third to one-fourteenth that of fixing a road that has fallen into disrepair.[20] Thus, in the long run, the more maintenance that is deferred now, the more disproportionately expensive it becomes to eventually fix the problem.

The poor condition of the transportation system and the increasing backlog of unmet needs make it imperative that the region find a way to reduce the funding gap. The majority of the funding that the region currently uses to build, maintain, and repair its road and transit infrastructure currently comes from the federal and state governments. In reviewing the expectations for funding from these two levels of government, it is clear that the region cannot expect a major increase in funding from either of these sources. Thus, other possibilities for increasing revenues, such as Public-Private Partnerships (PPPs) and/or local funding options, must be seriously considered. On the expenditure side, the region can work to right-size projects and reduce costs through better control and project management.

[20] Rough Roads Ahead. AASHTO. Washington, DC. 2009.

"Much of the country's metropolitan infrastructure was built in the last half of the 20th century and will reach its capacity limits early in the 21st century. Unless new capacity is created in roads, rails, airports, seaports, and other systems, the nation's economic potential will be artificially limited."

America 2050: A Prospectus
Regional Plan Association

The Vision

Each successive iteration of the Long-Range Plan has had to remove projects that were included in the previous version of the Plan in order to maintain fiscal constraint. More and more funding is being shifted toward maintaining and reconstructing the system, yet the funding gap continues to grow. Several regional priorities to expand the current transportation network were not able to be funded in the *Connections* Plan. This was especially true for the transit system, where two projects included in the *Destination 2030* Plan, the Broad Street Subway extension to the Navy Yard and the RiverLine extension to the state capitol in Trenton, were unable to be included in *Connections* because there is not enough revenue to cover their cost. There are several other rail lines that are being studied across the region, including the Devault Line between Phoenixville and Paoli and the Octoraro Line between Wawa and Nottingham, which are also unable to be funded in the Plan due to fiscal constraint. These routes and others like them are the true vision for the future. The set of projects that are able to be funded represents only a portion of what is needed for the region to attain the potential of the vision.

The more pragmatic issue is not about attaining a vision, but about simply maintaining what we have. As noted throughout the Plan, the region has a massive funding gap, particularly with regard to highway pavement and bridges and rail and transit vehicle infrastructure.

The true vision for our highway system is to be able to rebuild and maintain the existing infrastructure. This includes being able to fund freight rail projects in order to facilitate goods movement, relieve congestion, and improve air quality. The reality, as shown in *Connections*, is that we can only accomplish rebuilding and maintaining about half of the identified roadway and bridge needs. There are several major multibillion dollar reconstruction projects relating to the reconstruction of I-95 between Center City and the Delaware State Line that are not able to be fully funded in the Plan. This highway segment is critical to the region's ability to move people and goods, yet alone would utilize virtually the entire amount that the region has available to rebuild bridges over the Plan's entire 26-year lifespan. Considering all the other critical pieces of the transportation network that need rehabilitation or replacement, and the magnitude of the task becomes daunting.

Federal Funding Outlook

In *Infrastructure 2008*, The Urban Land Institute estimated that there is a $170 billion annual funding gap for infrastructure nationwide. Recognizing this as a critical issue, the National Surface Transportation Policy and Revenue Study Commission recommended that the federal fuel tax be increased from five to eight cents per gallon per year for five years, after which it should be indexed to inflation. The Commission also suggested that truck taxes increase proportionally with fuel taxes.

Despite the fact that the federal gas tax of 18.4 cents per gallon has not been increased since 1993, there currently appears to be little political will to raise it. Meanwhile, the Highway Trust Fund needed an $8 billion infusion from the general fund to avoid insolvency in 2008, and will likely need more infusions in the next few years if revenues do not increase or expenditures are not cut back. Poor economic conditions, rising fuel prices, and more fuel-efficient vehicles have meant less gas tax revenue. In addition, current gas tax revenue has lost significant purchasing power due to recent increases in FHWA's Bid-Price Index of highway project costs.

In September 2009, new federal transportation legislation was due to replace SAFETEA-LU, which was enacted more than a year late in 2005. Details surrounding the new transportation legislation remain unclear, and it seems increasingly likely that Congress will continue to act to extend the current legislation in the short term rather than act on a reauthorization. The reauthorization will also be further clouded by the 2009 American Recovery and Reinvestment Act (ARRA), which provided an additional $48.1 billion in transportation funding nationwide. Regardless, without an increase in the fuel tax, or another transportation-specific tax, the insolvency issues related to the Highway Trust Fund make it unlikely that the region can expect significantly higher federal transportation funding levels anytime soon.

State Funding Outlook

In July 2007, Pennsylvania Act 44 was passed, increasing transportation funding by 30 percent over previous levels. This bill expected an average of $946 million in additional funding for highways and $432 million devoted to transit. To pay for this additional funding, Act 44 created a lease of the Pennsylvania Turnpike between the commonwealth and the Pennsylvania Turnpike Commission (PTC), which provides $450 million per year in guaranteed funding ($250 million to transit and $200 million for highways) and allows the PTC to enact tolls on I-80 in the northern portion of the commonwealth. Five billion dollars in bonds were issued to generate new highway and bridge funds. These are backed by increasing tolls on the Pennsylvania Turnpike and by implementing new tolls on I-80. This new highway and bridge funding is restricted to the preservation and restoration of the existing system, operations, and maintenance.

Three years of guaranteed additional transportation funding ($750 million for FY 2008; $850 million for FY 2009; and $900 for FY 2010) were paid for through the initial bond revenue. Beginning in FY 2011, these amounts are slated to grow by 2.5 percent annually with the implementation of the I-80 tolls. Without the tolls, these amounts will go to zero for both additional highway and transit funds. The lower revenue scenario of no tolls placed on I-80 is assumed in the *Connections* Plan because FHWA has not yet approved the tolling of I-80. Moving forward with the tolls, or finding an alternate source of revenue, would provide urgently needed additional revenue for the Pennsylvania subregion.

Passage of Act 44 came in response to the findings of the Transportation Funding and Reform Commission (TFRC), which published the final report of its findings in November 2006. This report identified three levels of funding need in Pennsylvania. A baseline preservation level established what additional funds are needed to adequately maintain the current transportation network. For the entire commonwealth, this was estimated to

"The problem is not simply insufficient investment, our system is underpriced. Basic economic theory tells us when something valuable – in this case roadway space – is provided for less than its true cost, demand increases and shortages result … All too often the prices paid by transportation system users are markedly less than the costs of providing the transportation services they use (including pavement repair) – and much less than the total social costs (including traffic congestion and pollution). This underpayment contributes to less efficient use of the system, increased pavement damage, capacity shortages and congestion."

Paying Our Way
National Surface Transportation Infrastructure Financing Committee

be $497 million for transit and $546 million for highways and bridges per year above then-current funding levels. To expand the system, either through incremental improvements or mobility expansion, would require a significant amount of new revenue above the baseline. Statewide incremental improvements were estimated to need an additional $659 million for transit and $1.013 billion for highways and bridges. Mobility expansion throughout the state would call for an extra $820 million for transit and $1.464 billion for highways and bridges per year above funding levels at that time. Fully funded (i.e., including I-80 tolls), Act 44 provided only enough funding to meet the statewide preservation funding need. It did not include enough funding for either incremental improvements or mobility expansion.

In New Jersey, the Transportation Trust Fund (TTF) is set to expire in 2011. Statewide needs have been estimated for transit in the 2004 Blue Ribbon Report of $490 million per year in additional funding for transit maintenance and an additional $700 million per year to increase transit service. An analysis of the NJDOT 10-year Program shows that annual available state funding is $1.8 billion, but the annual funding needed is $3.6 billion. The greatest shortfall is in bridge maintenance and congestion reduction.

Local Funding Outlook

A key finding of the TFRC report is that regional and local areas in the state provide little in terms of matching funds for transit. The regional/local funding match for transit in the five-county Pennsylvania subregion of DVRPC has been just under six percent for capital and operating expenses, in comparison to peer region averages of 33 percent. In fact, of the top 10 U.S. metropolitan regions by population, only Boston approaches the local contribution of Greater Philadelphia, and their 11.5 percent local funding contribution is nearly double our rate. If the region were to match Boston's local contribution percentage, there would be an additional $97 million annually for transit service improvements. Matching the peer region average of 33 percent local funding would provide an additional $477 million annually. Such funding amounts could have considerable impact on the quality of transit service in Greater Philadelphia.

The low local funding match in Pennsylvania is partly due to the lack of authority to raise revenues at the regional or local level. As a response to this, the TFRC proposed a 25 percent local match requirement in exchange for more local decision-making, and made several suggestions for dedicated tax revenues to generate funds.

Act 44 of 2007 increased the local funding match for Class 1 transit systems like SEPTA to 15 percent for operating programs, while keeping the 3.33 percent

2007 Local Transit Funding Comparison to Other Major Metropolitan Regions

Capital Funds	Atlanta	Boston	Chicago	Dallas	Denver	Houston	Los Angeles	Miami	New York*	San Diego	San Francisco	Washington D.C.	Peer Average	Greater Philadelphia*
Fare Revenue	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4.2	$ -	$ -	$ -	$ 0.4	$ -
Local Funds	$ 115.8	$ 18.0	$ 166.0	$ 71.4	$ 140.8	$ 212.1	$ 488.4	$ 54.4	$1,657.8	$ -	$ 445.3	$ 96.2	$ 288.9	$ 28.0
State Funds	$ 8.7	$ 116.8	$ 28.5	$ 339.1	$ -	$ -	$ 117.5	$ 35.2	$ 336.1	$ 55.4	$ 43.7	$ 40.5	$ 93.5	$ 176.0
Federal Assistance	$ 40.2	$ -	$ 352.5	$ 97.0	$ 107.7	$ 43.2	$ 246.9	$ 85.0	$1,580.8	$ 6.7	$ 123.2	$ 37.1	$ 226.7	$ 251.2
% Local	**70.3%**	**13.3%**	**30.4%**	**14.1%**	**56.7%**	**83.1%**	**57.3%**	**31.1%**	**46.4%**	**0.0%**	**72.7%**	**55.3%**	**47.4%**	**6.2%**
Operating Funds	Atlanta	Boston	Chicago	Dallas	Denver	Houston	Los Angeles	Miami	New York*	San Diego	San Francisco	Washington D.C.	Peer Average	Philadelphia*
Fare Revenue	$ 104.9	$ 395.9	$ 682.8	$ 42.4	$ 78.6	$ 56.9	$ 370.2	$ 90.4	$4,101.4	$ 76.0	$ 469.6	$ 514.9	$ 574.5	$ 457.7
Local Funds	$ 228.7	$ 159.0	$ 530.1	$ 318.6	$ 259.9	$ 212.3	$ 746.4	$ 351.3	$1,779.8	$ 18.7	$ 466.2	$ 369.3	$ 453.4	$ 74.5
State Funds	$ -	$ 837.0	$ 199.8	$ 2.2	$ -	$ -	$ 207.9	$ 15.1	$2,748.9	$ 69.9	$ 115.1	$ 221.7	$ 368.1	$ 515.9
Federal Assistance	$ 93.2	$ -	$ 325.6	$ 81.7	$ 92.6	$ 108.2	$ 972.5	$ -	$ 395.7	$ 65.4	$ 65.5	$ 37.1	$ 186.5	$ 248.6
Other	$ 116.4	$ 12.6	$ -	$ -	$ -	$ -	$ -	$ 3.6	$ 58.0	$ -	$ 27.0	$ 23.9	$ 28.5	$ 0.2
% Local	**42.1%**	**11.3%**	**30.5%**	**71.6%**	**60.3%**	**56.2%**	**32.5%**	**76.3%**	**19.6%**	**8.1%**	**40.8%**	**31.6%**	**28.1%**	**5.7%**
% Local Capital + Operating	48.7%	11.5%	30.5%	40.9%	59.0%	67.1%	39.2%	63.9%	27.1%	6.4%	51.9%	34.7%	**33.4%**	**5.9%**

* Assumes 86 percent of NJ Transit ridership occurs in New York City region and 10.5 percent occurs in Greater Philadelphia region.
All figures in millions of dollars
Source: National Transit Database 2007

requirement for capital expenditures. Two local tax options were authorized to raise this funding match: a $2 per day vehicle rental fee, or up to a 10 percent increase in the retail liquor tax. For local road and bridge improvements, the bill allocated an additional $35 million per year in state funding above previous levels.

Local funding match requirements in Act 44 for transit remain well below peer region averages. Limited local tax options handicap the region's ability to fulfill its transportation goals. This puts the region at a competitive disadvantage when compared to its peers across the nation.

The region does not have the power to control the level of federal or state funding that it receives, and it is unlikely that the federal government, Pennsylvania, or New Jersey will significantly increase transportation funding anytime soon. Nor can the region control rising labor and materials costs. Given the large set of needs that will remain unmet at currently available funding levels, the region needs to seek ways to close its funding gap. This can be through raising additional revenues via local funding options or public-private partnerships, or on the expenditure side through project right-sizing and better program management.

Project Right-Sizing

Right-sizing and seeking efficiencies throughout the transportation system are precursors to any discussion of raising additional revenues. Project right-sizing is a key component of the "smart transportation" program being instituted at both PennDOT and NJDOT. Smart transportation works to resolve transportation problems with solutions that are context sensitive, affordable, supported by the communities involved, and can be implemented in a reasonable timeframe. Right-sizing means the DOT will consider reduced scale alternatives like network additions or transportation system management before developing alternatives such as new or widened roadways. If safety, and not congestion, is the problem, the DOT will consider focused solutions that can improve safety without increasing capacity. However, safety must be considered in all projects.

Since financial resources are very limited in both New Jersey and Pennsylvania, as seen in the needs assessment, wise investment in transportation infrastructure requires sensitivity to the constraints of available funding. Virtually all projects offer a range of design options, with different costs corresponding to different levels of value. However, the importance of understanding alternatives based on the value-to-price ratio is often overlooked. Performance measures, such as cost per existing trip, cost per new trip, and cost per time savings for a representative trip, may be used to better understand the return on a proposed investment. These measures attempt to direct projects toward the most effective value-to-price yield.

Both NJDOT and PennDOT have capital investment committees that review cost estimates for all major projects and determine if the project should move forward. Acting as "gatekeepers," these committees are tasked at key decision points with evaluating the proposed investment in relation to potential benefits and federal, state, and regional priorities.

Local Funding Options

Additional funding is needed if the region wants to realize the transportation goals set forth in this Plan. These new funds will most likely need to be generated at the regional level. To do this, the region needs to find ways to translate the growth in its economic vitality into improvements in the transportation system. Ideally, any new local transportation funding sources should be easy to implement, stable and sustainable over time, equitable both for system users and over geographic areas, and should not yield unintended negative economic impacts. An added bonus for any tax or fee is if it supports the goals of the Plan.

DVRPC's *Options for Filling the Region's Transportation Funding Gap* was prepared to help decision-makers consider how much funding different revenue options could generate for the Pennsylvania subregion. This report also considered the ease with which each option could be implemented, how well each option is tied to transportation, how stable and equitable funding would be, and its potential economic impacts. A similar exercise has been conducted for the New Jersey subregion, with a number of different local revenue options. Options could include bonds, dedicating taxes or fees to transportation programs, or new or increased tolls.

Many economists and transportation experts are beginning to recognize that congestion-based fees are directly tied to transportation system use and can be used for travel demand management, which can increase the system's efficiency. In many ways they are similar to or dependent upon tolling.

Most of these options require state-enabling legislation before the region could pursue them any further. It is not likely that any single option could fill the funding gap on its own. DVRPC has not identified any of the options as a preferred alternative. Rather, the hope is to generate discussion and develop consensus on the optimal funding mechanisms to help the region achieve its transportation goals. Various options for raising additional revenue are discussed below and have been grouped into four major categories: bonds; taxes and fees; tolling; and public-private partnerships.

Bonds

Pennsylvania suffered heavily due to overexposure from bond borrowing for transportation projects in the 1970s. As a result, the commonwealth has long relied exclusively on pay-as-you-go funding for transportation improvements. Pay-as-you-go funding works best with smooth expenditure levels. Large transportation projects cause spikes in expenditures, and bonds can help to fill the resulting short-term funding gaps created by implementing major system improvements.

"The fuel tax is directly related to gasoline and diesel fuel consumption, only indirectly related to system use, and negatively related to increased use of alternative fuels. Other funding mechanisms (such as vehicle registration fees or sales or property taxes) are even less related to usage. More direct charges for use of specific infrastructure (such as tolls or congestion pricing) can influence behavior, shifting travel to less congested times or modes such as transit or telecommuting. Such direct charges can promote better utilization of existing capacity and may reduce the need for additional improvements."

The Path Forward: Financing Our Surface Transportation System (Interim Report)
National Surface Transportation Infrastructure Financing Committee

When inflation is rising faster than construction costs, issuing bonds to speed up project development can lower its overall expense. Additionally, transportation investments can generate positive economic returns as a result of a more efficient system, helping to pay off the bonds through increased revenues. However, bonds are not a source of funding, but rather a tool to use for financing projects. There still needs to be a mechanism in place to eventually retire any outstanding bonds.

Montgomery County has been considering different ways to generate additional funding at the county level for transportation projects, possibly through bonds. If Montgomery County is successful in this venture, other counties may follow suit.

Taxes and Fees

The list of possible ways that the region could raise additional transportation funding includes direct user fees based on system use, indirect user fees, or taxes that are related to some extent to the use of the transportation system, and various excise or ad valorum taxes that are not related to the use of the system but may otherwise be impacted by it through higher property values or other factors.

Direct user fees include items such as vehicle miles traveled fees, tolling, and transit fares. Tolling will be discussed in the next section. These fees are or would be directly related to the use of the transportation system and can be easily varied for efficient system use, for example, by time period or during peak-hour congestion. As a result, these user fees are generally considered to be the fairest way to pay for system improvements. A number of recent studies and reports produced by agencies and commissions, including the National Surface Transportation Infrastructure Financing Commission (created by SAFETEA-LU to study and make recommendations for the future of transportation financing in the United States) have recommended switching transportation funding from the current per-gallon-purchased gas tax to a vehicle miles traveled fee. The variable nature of this type of fee, however, makes it less attractive to politicians and system users. Users may find them difficult to budget for, and those whose lifestyle or business is more dependent on heavy use of the system will be more impacted by increases in this use-based fee.

Indirect user fees and taxes such as fuel sales taxes, tire taxes, or parking taxes are only loosely related to the efficient use of the transportation system. In the case of the gas tax, the amount paid varies by user depending on vehicular fuel efficiency. This tax cannot be used to reduce peak-period demand for the network through higher costs. Over the long-term, increased fuel efficiency and growth in alternative fuel vehicles are likely to greatly diminish its revenue-generating ability. Likewise, the tire tax is related to vehicle miles traveled, but is not geared toward efficient system use. Parking taxes can be priced for efficient system use, but are not based on distance traveled.

Other indirect fees and taxes relating to automobile purchase and ownership, such as vehicle sales tax, title registration fees, and vehicle lease tax, are tied to the transportation system, but not its use. For example, an individual who drives 20,000 miles per year pays the same title and registration fees as a person who drives 10,000 miles per year. Sales and lease taxes are applied to the value of a vehicle, not its use. Property taxes, surface coverage taxes, tax increment financing, real estate transfer fees, and the access fee generally contain some additional value to the property owner from the transportation system. Improvements to the transportation network tend to correlate with increased nearby property values. Tourism-based taxes such as the hotel room rental tax and rental vehicle tax capture transportation use from nonresidents who otherwise may not pay their fair share for use of the system.

Earned income taxes and sales taxes are loosely tied to the transportation system, which moves the goods and services that drive the economy. While transportation system improvements do not necessarily lead directly to

Pennsylvania Subregion Local Funding Options Summary Table

				Significance	
Funding Option [1]	Proposed Rate	% Increase	Revenue (MM 2007 $s)	Rate Increase[2]	Revenue Increase
Access Fee	(a) $0.10 per sq ft – commercial building area near transit (b) $100 per acre – commercial property near highway exits	(a) N/A (b) N/A	(a) $5.3[3] (b) $2.4	(a) ◐ (b) ◐	(a) ○ (b) ○
Cigarette Tax [4]	Increase $0.43 per pack	31.9%	$89.2	●	●
Earned Income Tax [4]	Increase 0.08%	2.6%	$87.5	○	●
Fuel Sales Tax	6.0% of consumer price	N/A	$245.5	●	●
Hotel Room Rental Tax	Increase room rate by 1 percent	14% - 50%	$9.5	●	○
Liquor Tax [4]	Increase 10 percent	56%	$43.8	●	●
Occupational Privilege Tax	$10 annually per employee	N/A	$17.7	○	◐
Parking Tax	$20 per year per space	N/A	$44.0	○	●
Property Tax	Increase $0.001 per assessed value	0.8% - 3.8%	$144.0	○	●
Real Estate Transfer Tax [5]	Increase existing rates 0.5%	10.8% - 21.5%	$84.0	●	●
Regional Toll Surcharge	(a) $1.00 surcharge on 12 regional PA Turnpike exits (b) $1.00 surcharge on 4 bridges	(a) N/A (b) 33%	(a) $83.0 (b) $27.0	(a) ● (b) ●	(a) ● (b) ◐
Rental Vehicle Tax [4]	Increase $2 per day	100%	$10.2	●	○
Sales Tax [4]	Increase existing rate by 0.26 percent	3.7%	$144.0	○	●
Surface Coverage Fee	$5 per year per 1,000 sq ft of impervious surface cover	N/A	$19.7	○	◐
Tax Increment Financing (TIF)[5]	Dedicate 10 percent of annual growth in region's property tax to a TIF	N/A	$10.7	○	○
Tire Tax [4]	Increase $1 per tire sold	100%	$2.1	●	○
Toll Existing Highways	$0.08 (avg.) per VMT on major regional highways	N/A	$307.8	●	●
Transit Fare Increases [6]	Increase all fares by 1 percent	1%	$3.2	○	○
Vehicle Lease Tax	Increase 1 percent	33%	$7.4	●	○
Vehicle Miles Traveled Fee	$0.01 per mile	N/A	$266	◐	●
Vehicle Property Tax	0.25% of vehicle value	N/A	$94.1	●	●
Vehicle Registration Fee	Increase $10 per vehicle	27.8%	$21.4	●	◐
Vehicle Sales Tax [4]	Increase existing rate by 1 percent	16.7%	$70.7	●	●

1. Please see *DVRPC's Options for Filling the Region's Transportation Funding Gap* for detailed information on assumptions used to develop revenue estimates. Where existing tax data is not available, DVRPC has estimated potential tax revenues using vehicle registration, traffic volume, or GIS data for existing development and surface coverage for the 5-county PA subregion.
2. Where tax is not in existence (identified as N/A in '% Increase' column), DVRPC has estimated the impact in comparison to similar tax payments.
3. Estimate for Center City and University City, Philadelphia, and Montgomery County only.
4. The five-county PA subregion is estimated to represent 1/3rd of Commonwealth of Pennsylvania revenues in 2004.
5. Estimate is derived using five-county PA subregion tax revenues for 2004.
6. Estimate provided by SEPTA.

Source: DVRPC 2007

Legend:
● = Substantial Increase (> 10% or $30 Million)
◐ = Moderate Increase (> 5% or $15 Million)
○ = Slight Increase (< 5% or $15 Million)

New Jersey Subregion Local Funding Options Summary Table

				Significance	
Funding Option [1]	Proposed Rate	% Increase	Revenue (MM 2007 $s)	Rate Increase [2]	Revenue Increase
Access Fee	$100 per acre - commercial property near highway exits	N/A	$ 1.5	◐	○
Alcoholic Beverage Tax [3]	Increase 10 percent	10%	$ 1.9	◐	○
Cigarette Tax [3]	Increase $0.25 per pack	10%	$ 13.7	◐	○
Earned Income Tax	Increase existing rates by 1 percent	1%	$ 21.4	○	◐
Fuel Sales and Use Tax	7.0 percent of consumer price	N/A	$ 157.2	●	●
Hotel/Motel Occupancy Fee [5]	Increase room rate by 1 percent	20%	$ 1.8	●	○
Motor Vehicle Tire Fee	Increase $1 per tire sold	67%	$ 1.1	●	○
Occupational Privilege Tax	$10 annually per employee	N/A	$ 7.7	○	○
Parking Tax	$20 per year per commercial parking space	N/A	$ 22.5	◐	◐
Property Tax [4]	Increase $0.001 per assessed value	1.3% - 8.7%	$ 108.3	◐	●
Realty Transfer Fee [3]	Increase existing rates by 1 percent	1.0%	$ 1.1	○	○
Regional Toll Surcharge - Bridges	$1.00 Per 2 way crossing, split with Pennsylvania (Ben Franklin, Betsy Ross, Walt Whitman, Commodore Barry)	25%	$ 27.4	●	◐
Regional Toll Surcharge - Turnpike	$1.00 surcharge on regional NJ Turnpike, Garden State Parkway and Atlantic City Expressway exits	46.3%	$ 52.5	●	●
Sales and Use Tax [3]	Increase existing rate by 0.25 percent	3.6%	$ 56.4	○	●
Surface Coverage Fee	$5 per year per 1,000 square ft. of impervious surface cover	N/A	$ 8.9	○	○
Tax Increment Financing (TIF) [4]	Dedicate 10 percent of annual growth in region's property tax to a TIF	N/A	$ 19.3	○	◐
Toll Existing Highways	$0.08 (avg.) per VMT on major regional highways	N/A	$ 355.6	●	●
Transit Fare Increases [6]	Increase all fares by 1 percent	1%	$ 0.8	○	○
Vehicle Miles Traveled Fee	$0.01 per vehicle mile traveled	N/A	$ 152.6	●	●
Vehicle Registration Fee	Increase 10% per vehicle	10%	$ 6.1	◐	○

1. Where existing tax data is not available, DVRPC has estimated potential tax revenues using employment, traffic volume, vehicle ownership, or GIS data for existing development and surface coverage for the four-county NJ subregion.
2. Where tax is not in existence (identified as N/A in '% Increase' column), DVRPC has estimated the impact in comparison to similar tax payments.
3. Estimate is based on proportion of population in four-county NJ subregion to total statewide.
4. Estimate is derived using four-county NJ subregion tax revenues for 2007.
5. Assumes 2.2 million annual room rentals at average rate of $81 per night.
6. Estimate provided by NJ Transit.

Source: DVRPC 2008

Legend:
● = Substantial Increase (> 10% or $30 Million)
◐ = Moderate Increase (> 5% or $15 Million)
○ = Slight Increase (< 5% or $15 Million)

increased economic activity, failure to properly maintain and improve the system can create chokepoints and dampen commerce. Excise taxes such as the cigarette tax and liquor tax have no direct ties to the transportation system or its use. They remain, however, popular with politicians and easy to implement.

Tolling

DVRPC's *Options for Filling the Funding Gap* report considered the possibly of tolling existing 'free' highways and adding regional toll surcharges to facilities that are already tolled. These fees relate to the use of specific transportation facilities. To be equitable, the pain of paying for transportation improvements should be spread amongst various facilities to make a minor impact on users throughout the region, as opposed to on fewer facilities, which unfairly burdens only a portion of the region's transportation system users.

SAFETEA-LU further broadened federal policy concerning tolling interstates and other federal-aid highways. Continuing authority from Section 1216(b) of TEA-21, the previous authorization, allows the tolling of up to three existing interstate facilities to help pay for reconstruction. There is one authority remaining, which Pennsylvania applied for in 2008 for I-80 as a part of Act 44. The commonwealth's request was denied by the previous administration. A resolution to this issue has yet to be identified.

The Value Pricing Pilot Program (VPP) in Section 1604(a) in SAFETEA-LU allows variable (congestion or time-of-day) tolls on existing or new highways with electronic toll collection. This program is limited to 15 slots, of which one remains. Residual tolls from this program may be used for other Title 23 highway projects.

The Express Lanes Demonstration Program (SAFETEA-LU Section 1604(b)) allows tolling on either new or High-Occupancy Vehicle (HOV) lanes on interstates with electronic toll collection. This new demonstration program permits tolling on selected facilities to manage high levels of congestion, reduce emissions in a nonattainment or maintenance areas under the Clean Air Act Amendments, or finance added interstate lanes for the purpose of reducing congestion.

The Toll Facility Agreements program (Title 23 Section 129(a)) allows states to toll projects that also receive federal-aid grants for:

- Construction of new noninterstates,
- Reconstruction of existing tolled facilities,
- Reconstruction and conversion of free bridges and tunnels to tolled, or
- Reconstruction and conversion of free noninterstate highways.

Tolls must first be used for capital and operating outlays of that facility. Excess tolls may be used for other Title 23 highway projects.

Montgomery County has proposed creating tolls on US 422 and using the proceeds to pay for reconstruction and widening of this facility, as well as to finance the construction and ongoing operating expenses associated with the R6 Extension to Reading and Wyomissing, Pennsylvania.

Public-Private Partnerships

Private sector involvement is a way to stimulate development of large scale projects. Transportation agencies around the country are experimenting with various forms of public-private partnerships (PPPs) as a way to finance, deliver, operate, and even maintain highway and transit infrastructure. Some advantages of PPPs may include:

- Accelerating project development and construction through design-build contracting,
- Transferring construction completion and performance risk away from government,
- Providing enhanced operation and customer service as a result of performance-based compensation,

- Introducing new technologies, and
- Attracting new investment capital that otherwise might not be available.

There is a range of different possible PPP arrangements. PPPs can be used as a means for project procurement, such as a design-build contract, where the government assumes ongoing private operating and capital maintenance responsibility upon project completion. Alternatively, a PPP could shift responsibility for designing, building, operating, maintaining, and financing a project to the private sector.

The proposed lease of the Pennsylvania Turnpike to generate additional transportation revenue is a recent example of an asset-leasing PPP agreement. In these PPPs, a private entity (concessionaire) enters into an agreement to maintain and operate a public facility in exchange for the right to collect user fees. The agreement is for a finite period and the title of the facility remains with the governmental owner. Such an agreement essentially consists of a monetization (up-front sum) of future years' residual cash flows. Nationwide examples of these types of concessions include the leasing of the Pocahontas Parkway in Virginia, the Chicago Skyway in Illinois, and the Indiana Toll Road in Indiana.

A second type of PPP involves the building of a new tolled facility by the private sector. In exchange for taking responsibility for building, operating, maintaining, and possibly even financing a net revenue-generating project, the private enterprise controls the resulting financial rewards. A regional example of such a project was the design, build, operate, and maintain (DBOM) concession used to develop and operate the RiverLine between Trenton and Camden. This project was financed and continues to receive a subsidy from the New Jersey Transportation Trust Fund. Both PennDOT and the Pennsylvania Turnpike Commission have made limited use of design-build concessions. No long-term private concessions for transportation facilities have been made in Pennsylvania due to a lack of enabling legislation and legal opinions.

A third type of PPP is the tolling of existing 'free' highways. With increasing fuel efficiency, inflation, and escalating construction costs, the traditional gas excise tax-based funding is inadequate to meet ongoing needs. Many of the highways built in the 1960s and 1970s are approaching the end of their 40-year life cycle and will require massive expenditure levels for reconstruction, which cannot be readily met from existing sources. I-95 in Philadelphia is but one example of a roadway that the region needs to reconstruct but currently lacks the funding needed to fully carry out.

A fourth type of PPP utilizes private funds to build public projects. Both Pennsylvania and New Jersey have 'partnership acts,' which encourage private developer contributions to advance transportation projects. These funds often come as a result of a major development impacting the local transportation network. The rationale for such an approach is that the developer's contribution (or implementation in absence of public funds) serves to speed up project delivery, resulting in enhanced overall accessibility to the development. Partnership funds have helped finance many major transportation improvements in the past, such as the PA 29 and US 202 interchange in Chester County, and continue to be planned and implemented today. For example, a project in Mercer County to add a lane of grade-separated flyover in each direction on County Road 533 over the intersection with Country Road 638 (LRP ID #99) has received $2 million in private developer funding. Where municipalities and developers can reach contribution agreements, this can be a source of revenue for transportation improvements and can reduce the amount of funding that the public needs to provide.

Call for Action

During the extensive public outreach conducted for the *Connections* Plan, DVRPC outlined the challenge to increase local funding for transportation investments. Participants in focus groups spoke of the region's transportation system as a shining asset. They also agreed that rebuilding the system should be the top transportation priority and acknowledged that it will take a substantial financial investment to accomplish it. Workshop participants were asked, among other questions, what their vision of the future transportation system is and how they would pay for it. Many participants were well aware of the transportation systems' value to the region and how it is tied to land use, the environment, and the economy. The participants recognized that issues such as reducing automobile reliance, preparing for reduced levels of oil and rising energy prices, and providing transportation alternatives are related to increasing density, preserving farmland and open space, and reducing greenhouse gas emissions. At the same time, they also recognized that it will be a difficult task to achieve these goals. Changing settlement patterns is not easy once they are in place, and raising taxes to pay for transportation improvements is politically difficult to do. Nevertheless, virtually all workshop participants agreed on the need for action. The participants called for leadership to be shown on all these issues, including generating more revenue locally. While no consensus was reached on specific tax or fee mechanisms, there was general agreement that additional costs should be borne by users of the system. Other workshop participants called for incentives to promote development that can support the transportation and other goals of the Plan. Many pointed out that the key to promoting these ideas to the general public is to show what benefits the region will receive in return.

The *Connections* Plan, through considerable public input, has attempted to create a vision of a more sustainable region in the future. Improving transportation infrastructure is a major key to achieving sustainability, and more funding is needed to make the vision a reality. Transportation infrastructure does not exist in a vacuum–it shapes land use, impacts the environment, and affects our global competitiveness. The Plan is about creating more choices for an aging population, where many retirees and young people are already showing a preference for smaller housing units located in dense, vibrant communities with easy access to alternative transportation. For those who prefer the suburban lifestyle, there will remain an ample supply of single-family suburban housing. Drivers will benefit from the provision of better information, improved safety, and reduced congestion. However, the automobile and suburban house will not be the only option. In a world of increasing scarcity, growing concern about climate change, intense global competition, and an aging population, provision of mixed-use, transit-oriented communities are critical for reducing CO_2 emissions, attracting skilled workers, and providing for quality of life.

To achieve this vision, the region's residents and businesses will need to make the choices that support it. They will need to vote with their feet, as to where to locate, and with their wallet, to pay for the transportation improvements needed to make the Plan a reality. The Plan does not advocate any particular funding alternative. It is likely that a combination of several funding mechanisms is needed in order to fully fund the region's identified needs. However, since federal and state funding levels are not expected to increase and the region's local funding contribution is low compared to other large metropolitan areas, additional funding will most likely need to be raised here in Greater Philadelphia. This Plan is issuing a challenge to the region's leaders, stakeholders, and citizenry to reach consensus on new local and regional means of maintaining and modernizing the region's critical transportation infrastructure, which impacts not just our standard of living, but our economic competitiveness and environmental sustainability.

LIVABLE COMMUNITIES

ENERGY & ECONOMY

ENVIRONMENT

TRANSPORTATION

CHAPTER 7

Implementation

The *Connections* Plan presents a blueprint for a sustainable future. However, it will remain only a plan unless it is implemented. As a regional entity, DVRPC is uniquely positioned to bring together area government, business, and nonprofit leaders to begin discussing and taking action on many of the critical issues that will arise in coming years. DVRPC is already taking initiative on a number of the policies that are outlined in the Plan.

The *Connections* Plan identifies targets for each of the four key Plan principles. The targets will help achieve the principle through tangible action. The targets represent a significant change from business-as-usual and will require a drastic transformation to implement. However, they also represent an opportunity to forge a new approach. For each target, DVRPC has identified a set of key action strategies.

Manage Growth and Protect Resources: Preserve 500,000 acres of open space

- Focus future development as infill and redevelopment in existing areas and target new development to designated future growth areas.
- Encourage compact, centers-based development through smart growth tools and techniques, such as transit-oriented development, traditional neighborhood design, transfer of development rights, and revitalization and stabilization of existing development.
- Employ a range of regulatory, voluntary, and funding techniques to preserve open space, including fee-simple acquisitions, conservation easements, locally funded open space programs, statewide preservation trusts, municipal natural resource protection plans and ordinances, and market-based conservation, such as transfer of development rights programs.

Create Livable Communities: Invest in 100 Centers

- Update zoning codes to allow for increased density and a mix of uses in select, appropriate areas to encourage transit-oriented and pedestrian-friendly development.
- Increase the stock of affordable housing units in suburban centers close to jobs and services served by public transit, while also increasing employment in places where affordable housing opportunities currently exist.
- Increase community-scale green infrastructure through techniques such as planting and stewardship of shade trees, green streets, green roofs, green schoolyards, community gardens, and trails.

Build an Energy-Efficient Economy: Reduce Greenhouse Gas Emissions by 50% by 2035

- Prioritize transportation system investments that serve key employment sectors and expand the Greater Philadelphia region's connections to the global economy.

- Reduce demand for services and energy provision by locating jobs, housing, and services closer together and encouraging denser development.
- Use more efficient cars, furnaces, and lighting, and produce energy with less CO_2 by switching to noncarbon fuels.

Establish a Modern, Multimodal Transportation System: Contribute $100 Million in Local Funding for Transportation Projects Annually.

- Establish a local funding mechanism to contribute to the financing of transportation projects of regional significance.
- Ensure that transportation projects are "right-sized" in order to scale the solution to the size of the problem and tailor the approach to the specific project.
- Select transportation projects for capital programming based on sound long-range strategic planning considerations, life-cycle investment analyses, and system performance and condition data.

DVRPC Efforts

DVRPC strives to implement the vision and policies of the *Connections* Plan through its work program and projects. To begin with, DVRPC serves as a regional information resource. The most up-to-date census and other data; state-of-the-art Geographic Information Systems (GIS); aerial photography; and various other economic, employment, housing, environmental, and transportation reports and information are maintained by DVRPC.

As part of its work program, DVRPC conducts corridor studies and local area plans. These studies involve working together with groups of communities along a corridor or area to consider what transportation improvements are needed, what impacts new transportation infrastructure will have on the local environment, what the area would like to look like and how it would like to function, and what steps are needed to get there. DVRPC also conducts detailed technical analysis on specific subjects such as climate change, transit-oriented development, regional economic development strategies, civic design excellence, and local food production and distribution.

To implement the *Connections* Greenspace Network and Conservation Focus Areas at the local level, DVRPC offers New Jersey municipalities a program of services–the "Open Space and Natural Resource Planning Program"–through which a municipality can conduct in-depth planning to protect its important environmental resources, its land, and its quality of life. This successful program assists communities in assessing the current state of their resources, works with the public and community leaders to articulate a future vision, and develops specific municipal tools that a community can use to achieve its vision. Municipalities can choose from the following "market basket" of planning services to meet their diverse needs: community visioning, environmental resource inventories, open space and recreation plans, farmland preservation plans, including planning incentive grant applications, conservation elements of the master plan, greenway plans, build-out analysis, and environmental protection ordinances, such as conservation subdivision design. Natural resource protection tool usage in the region is monitored to gauge which municipalities are using which tools so that underutilized tools can be targeted to communities that would benefit the most. Sample ordinances are also collected and posted on the DVRPC web site for municipalities to utilize.

DVRPC produces materials specifically designed to help municipalities throughout the region implement regional goals through its Municipal Implementation Tools (MIT) brochures series. The MIT series consist of "how to" guides on a variety of planning topics related to the regional Long-Range Plan. To date, 18 MITs have been produced and widely distributed to all the municipalities in the region, as well as to participants at various conferences covering the topics. A sampling of the subjects covered in the MITs include: parking management strategies, historic preservation, inclusionary housing, aging in place, form-based codes for big-box retail, municipal tree management, safe routes to school, and road diets.

DVRPC also acts as a facilitator to bring together stakeholders throughout the region to discuss regional issues. A number of committees convened by DVRPC bring together elected officials, planners, professional practitioners, and the private sector. DVRPC committees include:

- **The Regional Citizens Committee (RCC)** provides citizen access to and participation in the regional planning and decision-making process. The RCC Chairman sits as a nonvoting member of the DVRPC Board and reports the RCC recommendations to the Board for its appropriate action.
- **The Regional Community and Economic Development Forum** provides a regional forum for land use, housing, and economic development issues facing Greater Philadelphia and directs land use, housing, and economic development research and planning activities by DVRPC staff. The committee makes recommendations to the DVRPC Board and staff on issues to be addressed in the annual work program; keeps DVRPC Board and staff apprised of current and emerging citizen concerns relating to land use, housing, and economic development; and serves in a technical review capacity on all related studies being conducted by DVRPC staff.
- **The Planning at the Edge Advisory Committee** attends to inter-regional issues and projects and provides outreach to adjacent metropolitan planning organizations and counties with the goal of achieving cooperative solutions. The committee was formed to help initiate discussion on proposed coordination, communication, and cooperation techniques, issue and project priorities, and other potential collaborative activities.
- **The Regional Safety Task Force** brings together a multidisciplinary group of professionals to reduce the number of crashes and the resultant casualties in the region. It meets quarterly to build effective partnerships, exchange information, and guide planning efforts.
- **The Transportation Operations Task Force**, composed of technical staff representatives from over 35 regional stakeholders, is the focal point of regional ITS coordination. The Task Force is a forum for agencies to share information on ITS deployments and incident management programs, develop a consensus on regional ITS issues, and respond to federal initiatives. It has the ability to establish subcommittees to tackle specific issues as they arise.
- **The Delaware Valley Goods Movement Task Force** was established to maximize the region's goods movement capability by sharing information and technology between public and private freight interests, promoting the region's intermodal capabilities and capacity, and developing and implementing a regional goods movement strategy. It advises the DVRPC Board on all goods movement issues, studies, and projects.
- **The Regional Aviation Committee** provides technical and policy guidance concerning regional airport systems planning to the Federal Aviation Administration, the states, and DVRPC. Membership is open to all aviation-related professionals, local governments, consultants, and interested citizens.
- **The Central Jersey Transportation Forum** has been meeting since 1999 to address concerns of municipalities in Mercer, Middlesex, Somerset, and Hunterdon counties focused on the US 1 corridor. It gathers high-level representatives from 21 municipalities with relevant county, state, and other organizations to coordinate and to initiate solutions. The Forum itself is not an implementing agency. The key issues that it addresses are east-west access; improving coordination of transportation and land use in this high growth, congested area; and transit.
- **The Tri-County Water Quality Management Board** was created by the resolution adopting the 208 Final Water Quality Management Plan on March 23, 1978. This resolution states that "the mission of the Tri-County Water Quality Management Policy Board would be to adopt policy for the continuing planning process, establish priorities for the implementation of the adopted 208 program, and direct the lead agency's 208 planning role in the Tri-County area within the regional framework established by DVRPC." It primarily serves to coordinate water supply and wastewater treatment plans for Burlington, Camden, and Gloucester counties, and to maintain the Tri-County Water Quality Management Plan.
- **The Urban Waterfront Action Group (UWAG)** was created in 1980 through the Pennsylvania Coastal Zone Management (CZM) Program to

provide "one-stop" shopping for information about waterfront development permits in the Delaware Estuary. The UWAG meets monthly, as needed, to provide a pre-permit application service whereby potential waterfront developers and regulatory agencies can meet to identify and hopefully resolve potential permitting issues. The UWAG meeting occurs in advance of detailed project engineering.

- **The Information Resources Exchange Group (IREG)** was formed in 1991 to provide a forum to discuss the creation, use, and exchange of planning-related information in the Greater Philadelphia region. IREG also promotes knowledge sharing in the methods and technology for data analysis, synthesis, and presentation. To support its mission, IREG's activities and topics include data, metadata, modeling, forecasting, aerial imagery, geographic information systems, database systems, and the Internet as a data access and dissemination tool.

Finally, DVRPC's programs carry out and promote the goals of the Long-Range Plan. Many of the examples below provide grant funding to municipalities and other entities in the region to conduct planning or marketing work that forwards the mission of DVRPC and the goals of the Long-Range Plan.

Transportation and Community Development Initiative (TCDI)

TCDI provides grants to support local development and redevelopment efforts in the region's core cities, developed communities, and mature suburbs. The grant program funds projects that will serve to improve the overall character and quality of life within these communities to retain and attract business and residents, thereby also reducing pressure for further sprawl and expansion into growing suburbs and rural areas of the region.

Efficient Growth for Growing Suburbs (EGGS)

The EGGS program recognizes the challenges that the growing suburbs of the region face and provides grants to these municipalities to improve growth management and community design and to optimize the efficiency of their existing and planned transportation network through better linkage of land use and transportation planning. EGGS grants support planning, design, preliminary engineering, ordinance writing, and feasibility studies such as roadway connectivity plans, transfer of development rights programs, and zoning and design guidelines for converting aging and automobile-oriented industrial parks into thriving, mixed-use, and pedestrian-oriented centers.

Strategies for Older Suburbs

The Strategies for Older Suburbs program focuses on revitalizing the older developed communities of the region. Work includes technical advice on redeveloping abandoned parcels of land, such as brownfields and greyfields, as well as providing the *Municipal Resource Guide*, which is an up-to-date directory of funding programs for older communities. The Strategies for Older Suburbs program also partners with other organizations such as the Urban Land Institute on periodic forums to match up prospective developers with sites available for development in these older suburbs.

Classic Towns

The Classic Towns initiative grew out of the Strategies for Older Suburbs program. Classic Towns is a marketing program that aims to promote the region's developed municipalities and neighborhoods as great places to live, work, and play. Classic communities are often at a competitive disadvantage when it comes to attracting new businesses and residents. While Greater Philadelphia as a whole is promoted as a tourist destination and center of commerce, many suburban municipalities and urban neighborhoods lack the resources necessary to launch sophisticated and effective marketing programs that target specific segments of the public. Classic Towns includes a promotional video, website, and targeted forums on public relations, marketing, and other skill development to help attract investment in these towns.

TransitChek

TransitChek is a commuter benefit program administered by DVRPC that employers can offer to their employees to help pay for commuting on transit. It saves employers and commuters money because the program takes advantage of federal legislation that allows tax-free dollars to pay for transit fares.

The Mobility Alternatives Program

The Mobility Alternatives Program (MAP) can help companies improve their benefits package and even help employees save time and money on their commute. Using the MAP also helps reduce traffic and air pollution. MAP can help everyone find a better way to get to work in southeastern Pennsylvania. Whether it is on transit, in a car pool or van pool, or even working from home, MAP has information on what the alternatives are and how companies and individuals can take advantage of them. In addition, there is information on incentives, emergency rides home, flex time, and parking management. DVRPC also offers Share-A-Ride, a free, comprehensive, computerized commute match service that can put employees in touch with the most convenient transit options or other commuters going their way.

Air Quality Partnership

The Air Quality Partnership is a public-private coalition of businesses and organizations that promotes better air quality through voluntary actions to reduce air pollution. The partnership is administered by DVRPC and provides a daily air quality forecast for the region and tips to protect your health through a broad-based outreach effort.

Sustainable Skylines

The Sustainable Skylines Initiative is a partnership with EPA to coordinate efforts that have environmental and sustainability benefits for the region. DVRPC is convening local partners to develop projects that have quantifiable benefits for air quality, energy conservation, and quality-of-life issues. The Sustainable Skyline Partners cooperate to publicize sustainability efforts and attract new stakeholders to pool resources and maximize the benefits of these efforts for our region.

TreeVitalize Municipalities

TreeVitalize is a program launched in 2004 by the Pennsylvania Department of Conservation and Natural Resources to increase public awareness of the importance of community trees and to reverse the loss of tree cover in the state's metropolitan areas. DVRPC is an active partner in the TreeVitalize Municipalities Initiative, with the specific directive of helping local governments better incorporate tree management into their overall responsibilities through widespread outreach and education, and connecting communities with technical and financial assistance for planting and maintaining trees.

Coastal Zone Management Program

The Coastal Zone Management Program (CZM) is administered by DVRPC in the Commonwealth of Pennsylvania for the total region along the Delaware River. DVRPC assists with CZM grant applications, providing municipal assistance along the Delaware Estuary, and hosting the Urban Waterfront Action Group, which provides "one-stop shopping" for information about waterfront development permits.

What You Can Do

Your help is needed to fully implement the *Connections* Plan. Here are some action steps that everyone in the region can take to help bring the Plan to fruition. Taking these steps can help you and the region to reduce energy use and resulting greenhouse gas emissions, strengthen and create livable communities, support local economies, and improve the functionality of the region's transportation system. Many actions will even save you some money and contribute to a healthier lifestyle.

- Live, work, shop, and play in the region's centers;
- Take transit, walk, or bike to work and for any short trip;
- Link automobile trips together and travel during off-peak times;
- Purchase energy-efficient light bulbs, appliances, and cars; turn off lights and appliances when not in use;
- Make sure that your home is properly insulated and turn your thermostat to 75^{o} in the summer months and 68^{o} in the winter months;
- Conduct an energy-efficiency audit on your home or business, and consider renewable energy sources;
- Reduce polluting activities such as driving, mowing your lawn, or filling your car's gas tank on days with poor air quality;
- Support local food production by purchasing fresh food from local sources;
- Plant a tree, grow a garden, or start a neighborhood composting program;
- Vote for open space or transportation funding referendums; write your representatives to support the Plan's policies and goals; and
- Join us in shaping the future of our region by participating in public meetings, reviewing our website and publications, or joining the Regional Citizens Committee.

Getting There

The *Connections* Plan was developed with input from a broad array of regional stakeholders and the general public and is intended to be the region's plan for a sustainable future. Likewise, its implementation will also rely on a large cast of governmental entities; federal, state, and local agencies; nonprofit groups; and citizens. Attaining the vision and goals outlined in the Plan will require a collective effort that begins with an assessment of the impact that our individual actions have on the region. DVRPC will continue to work with regional stakeholders and the public to make the vision of the Plan a reality. By "thinking regionally but acting locally," DVRPC is able to achieve coordinated and cooperative action across municipal, county, and state lines; across local, county, state, and federal agencies; and across the public and private sectors.

DVRPC supports multimunicipal planning as a foundation for implementing the Plan. Multimunicipal planning allows neighboring municipalities to develop a shared vision and to coordinate on various planning issues, including growth management, infrastructure provisions, preservation of natural and historic resources, and economic development. It can also help municipalities receive funding from state agencies, address issues that cross municipal boundaries, and reinforce the importance of local planning.

As the region implements the *Connections* Plan, it will be important to determine whether the goals contained in the Plan are being met. The Tracking Progress project will continue to collect and compile a meaningful time-series data set that can help DVRPC and its partners make more effective decisions. Tracking Progress is an ongoing, outcome-based effort to align DVRPC's planning and implementation activities, and it will guide the region's investment strategy to help achieve the vision and goals set forth in the *Connections* Plan. In turn, these indicators will inform the development of the next long-range plan by identifying areas of strength and weakness and helping to prioritize initiatives within the Plan.

APPENDIX

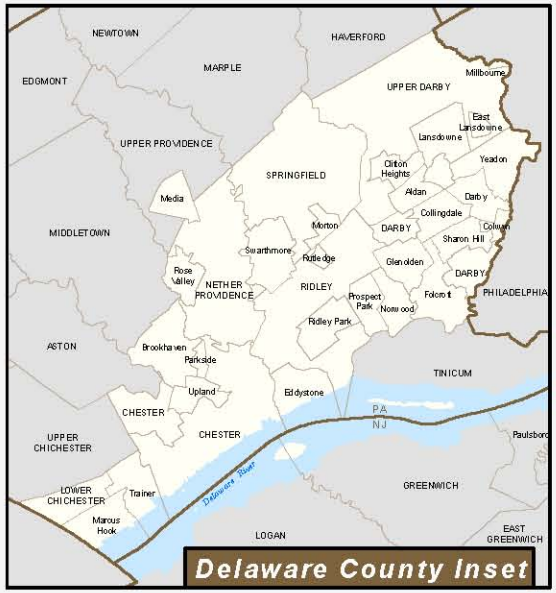
Acronyms

The following is a list of commonly used acronyms in planning and the *Connections* Plan.

AASHTO	American Association of State and Highway Transportation Officials
ADA	Americans with Disabilities Act
AQP	Air Quality Partnership
ARC	Access to the Region's Core (trans-Hudson tunnel)
ARRA	American Recovery and Reinvestment Act of 2009 (federal funding)
AVL	Automatic Vehicle Location Systems
BMS	Bridge Management System
BPI	Bid Price Index
BRT	Bus Rapid Transit
CAD	Computer Aided Dispatch (buses)
CCTV	Closed Circuit Television Cameras
CHSTP	Coordinated Public Transit Human Services Transportation Plan
CJTF	Central Jersey Transportation Forum
CMAQ	Congestion Mitigation and Air Quality (federal funding)
CMP	Congestion Management Process (of DVRPC)
CO_2	Carbon Dioxide (air quality)
CPI	Consumer Price Index
DOD	Degrees of Disadvantage (Environmental Justice)
DRPA	Delaware River Port Authority
DVRPC	Delaware Valley Regional Planning Commission
EGGS	Efficient Growth for Growing Suburbs (of DVRPC)
EJ	Environmental Justice
EPA	Environmental Protection Agency (of United States)
ESP	Emergency Service Patrols (highways)
EST	Environmental Screening Tool (of DVRPC)
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY	Fiscal Year (July 1 to June 30)
GA	General Aviation
GHG	Greenhouse Gases
GIS	Geographic Information System
GMTF	Goods Movement Task Force (of DVRPC)
HSIP	Highway Safety Improvement Program (of DVRPC)
IMP	Interstate Management Program
IREG	Information Resources Exchange Group
IRI	International Roughness Index (pavement)
IT	Information Technology
ITS	Intelligent Transportation System
JARC	Job Access Reverse Commute
LRP	Long-Range Plan (of DVRPC)
LUHC	Land Use and Housing Committee (of DVRPC)
LUTED	Land Use, Transportation, and Economic Development Forum (of DVRPC)
MAP	Mobility Alternatives Program
MIT	Municipal Implementation Tool (of DVRPC)
$MMTCO_2E$	Million metric tons of Carbon Dioxide equivalent
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
$MTCO_2E$	Metric tons of Carbon Dioxide equivalent
NAAQS	National Ambient Air Quality Standards

NEPA	National Environmental Policy Act
NHS	National Highway System
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NLT	Natural Lands Trust
NPS	National Park Service
NO_x	Oxides of Nitrogen (air quality)
PADEP	Pennsylvania Department of Environmental Protection
PADCNR	Pennsylvania Department of Conservation and Natural Resources
PATCO	Port Authority Transit Corporation (of DRPA)
PEAC	Planning at the Edge Advisory Committee (of DVRPC)
PEC	Pennsylvania Environmental Council
PennDOT	Pennsylvania Department of Transportation
PHL	Philadelphia International Airport
PMS	Pavement Management System
PPI	Producer Price Index
PPP	Public-Private Partnerships
$PM_{2.5}$	Fine Particulate Matter (air quality)
PTC	Pennsylvania Turnpike Commission
PTTF	Public Transit Trust Fund (of Commonwealth of Pennsylvania)
PUT	Pottstown Urban Transit
RAC	Regional Aviation Committee (of DVRPC)
RASP	Regional Aviation Systems Plan
RCC	Regional Citizens Committee (of DVRPC)
RIMIS	Regional Integrated Multimodal Information Sharing Project
RPO	Rural Planning Organization
RTAC	Regional Transit Advisory Committee (of DVRPC)
RWTS	Road Weather Information Systems
SAFETEA-LU	Safe, Accountable, Flexible Efficient Transportation Equity Act: A Legacy for Users (2005-2009 federal transportation legislation)
SCADA	Supervisory Control and Data Acquisition (transit technology)
SDI	Surface Distress Index (pavement)
SEPTA	Southeastern Pennsylvania Transportation Authority
SOGR	”State of Good Repair”
SOV	Single Occupant Vehicle
STIP	Statewide Transportation Improvement Program
TCDI	Transportation and Community Development Initiative (of DVRPC)
TDM	Transportation Demand Management
TDR	Transfer of Development Rights
TFRC	Transportation Funding and Reform Commission (of Commonwealth of Pennsylvania)
TIP	Transportation Improvement Program (of DVRPC)
TMA	Transportation Management Association
TND	Traditional Neighborhood Development
TOC	Transit Operations Center
TOD	Transit-Oriented Development
TOMP	Transit Operations Master Plan (of DVRPC)
TOTF	Transportation Operations Task Force (of DVRPC)
TTF	Transportation Trust Fund (of State of New Jersey)
VMS	Variable Message Sign
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds (air quality)
VPP	Value Pricing Pilot Program (tolling)
Y-O-E	Year-of-Expenditure dollars

Pennsylvania Municipalities within the Greater Philadelphia Region*



* *City Planning Areas are shown within Philadelphia*

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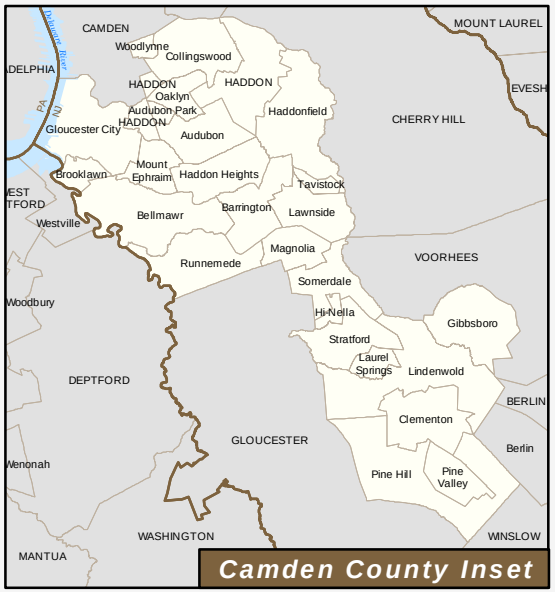
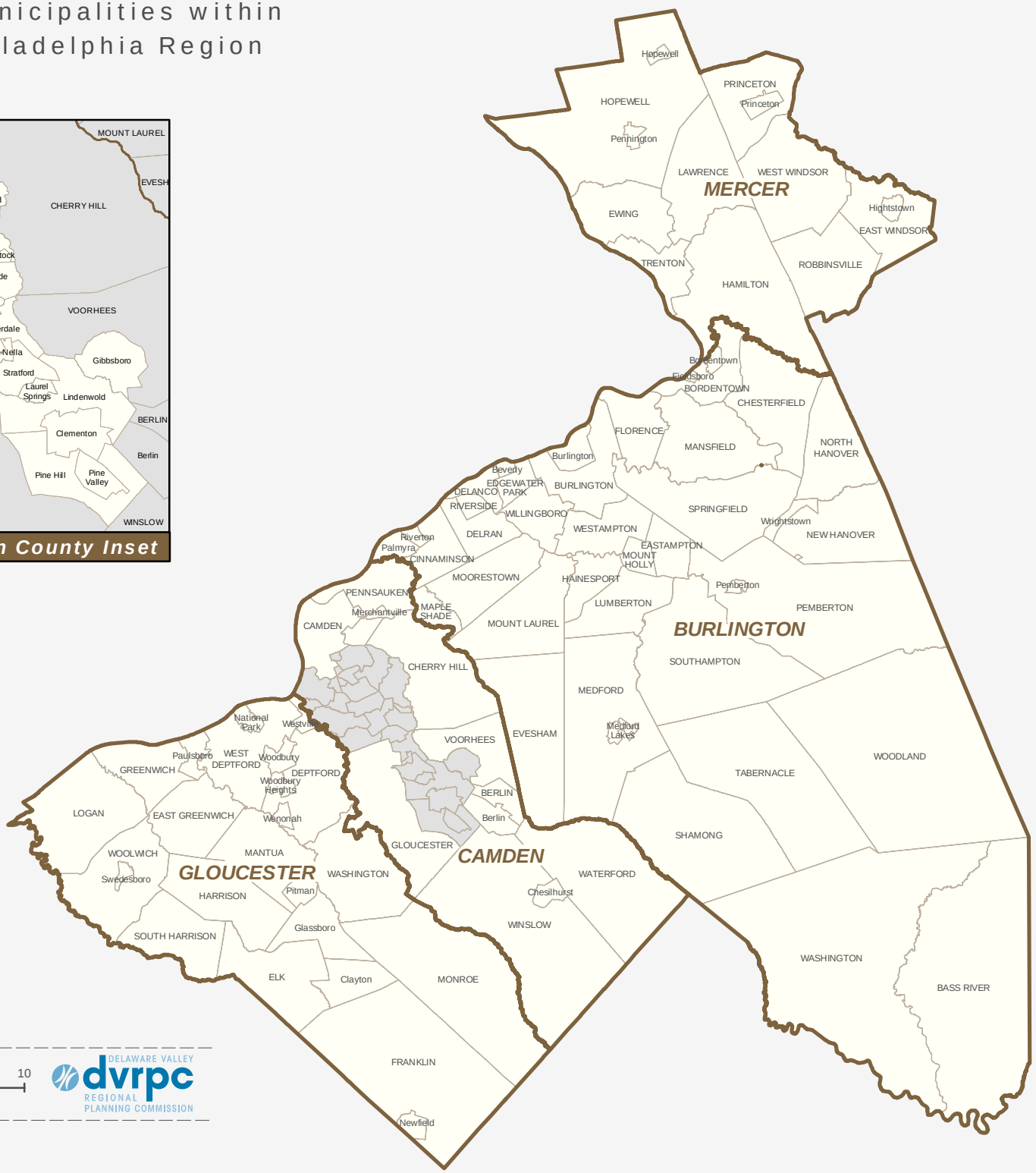
New Jersey Municipalities within the Greater Philadelphia Region





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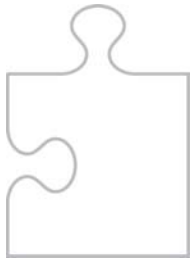
Abstract



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Abstract: The *Connections* Plan sets regional policy and agenda. It reviews long-term and recent development trends and considers future land use scenarios, along with extensive public input, as the basis for creating a regional vision to guide future development in the nine-county DVRPC region. The Plan is organized around four key Plan principles: Create Livable Communities; Manage Growth and Protect Resources; Build an Energy-Efficient Economy; and Establish a Modern, Multimodal Transportation System. The Plan includes a 26-year needs assessment for maintaining existing transportation infrastructure with limited new capacity expansion. Reasonably expected available revenue is used to constrain the identified need in the financial plan, including a list of major regional projects. To fully achieve the 'vision' beyond the constrained Plan, the region needs to consider alternatives, such as local funding options or public-private partnerships.

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