

CONNECTIONS *2040*

PLAN FOR GREATER PHILADELPHIA

fostering sustainability, equity, and innovation

MANAGE GROWTH AND PROTECT THE ENVIRONMENT | CREATE LIVABLE COMMUNITIES | BUILD THE ECONOMY | ESTABLISH A MODERN MULTIMODAL TRANSPORTATION SYSTEM





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.

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MANAGE GROWTH AND PROTECT THE ENVIRONMENT

CREATE LIVABLE COMMUNITIES



PHOTO: R. KENNEDY FOR GPTMC



PHOTO: G. WIDMAN FOR GPTMC



BUILD THE ECONOMY

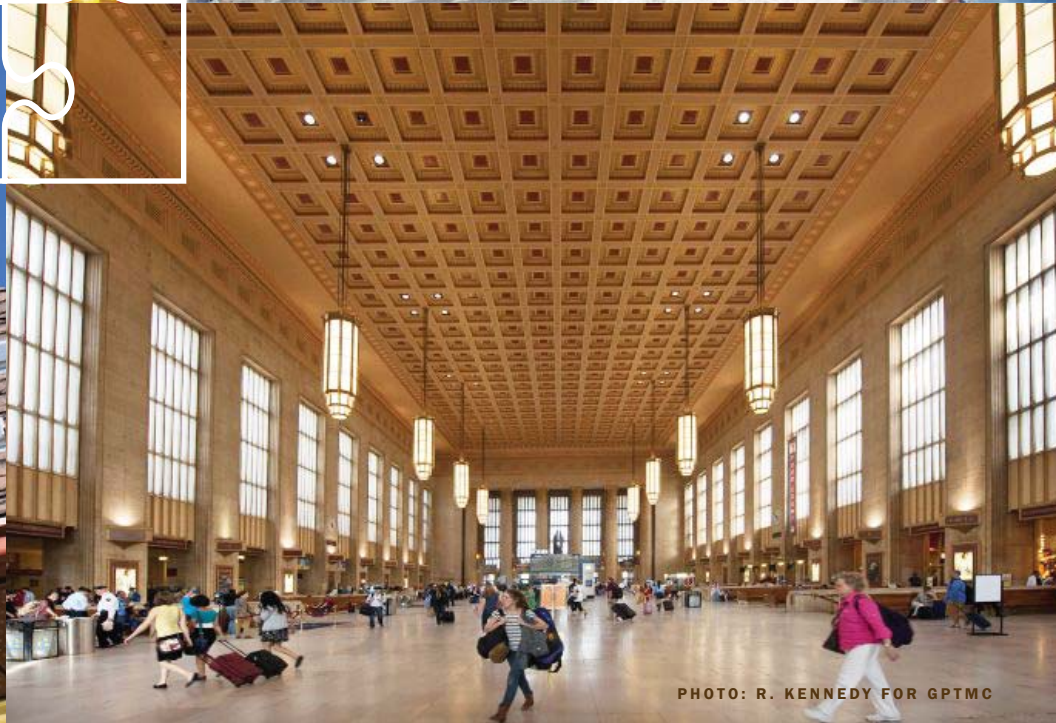


PHOTO: R. KENNEDY FOR GPTMC

ESTABLISH A MODERN MULTIMODAL TRANSPORTATION SYSTEM

EXECUTIVE SUMMARY

The *Connections 2040 Plan for Greater Philadelphia* is a long-range plan to achieve a more sustainable and prosperous future for Greater Philadelphia. The Plan was adopted by the DVRPC Board on July 25, 2013. It was developed in response to many of the trends associated with the land development patterns of the past several decades, in which the rate of land developed has eclipsed the region's population growth at a rate of five to one. This has contributed to many significant problems in the region, including loss of open space and prime agricultural lands, increased congestion and stormwater runoff, decreased air and water quality, lack of mobility and accessibility to jobs for workers, and disinvestment in established communities.

The Plan's vision calls for a more sustainable future that offers a superior quality of life by increasing mobility choices, preserving more open space, reinvigorating our existing communities, and reducing demand for energy. In this future, more compact, mixed-use development will shorten distances between destinations and encourage alternative forms of transportation. Less energy use will help to reduce carbon dioxide (CO₂) emissions, making the region more sustainable and economically competitive. By spending less on building duplicative new infrastructure ever farther out, more investments can be made in improving our existing core infrastructure. These benefits are inextricably linked.

The four integrated core principles of the Plan are: Manage Growth and Protect the Environment, Create Livable Communities, Build the Economy, and Establish a Modern Multimodal Transportation System. The Plan directs development and investment to our already-established communities. These over 120 identified Centers are existing communities that already have established residential and employment bases and existing infrastructure in place.

The Plan also identifies the investments that we will need to make in our transportation system to achieve such a future. Due to the expansiveness and the age of our transportation system, this transportation investment plan leans heavily toward projects that rebuild and preserve our existing system. It also identifies critical projects that help our system operate more efficiently, and new facilities that expand our system's capacity. Unfortunately, due to declining transportation funding, we can only achieve a portion of this vision.

Connections 2040 examines the causes of our funding crisis and puts forth some options for addressing the shortfall in order to begin a regional discussion on how we can achieve the vision. It also contains a prioritized set of projects, based on a quantitative analysis of need, which are able to be funded with anticipated revenues over the life of the Plan.

The Plan ends with a call to action. Achieving the goals laid out in the pages of the Plan will require a concerted, coordinated effort on behalf of elected officials, the business and advocacy community, and the public. The result will be a more sustainable, equitable, and innovative region that is ready to compete and prosper on the national and global stage.



01 | INTRODUCTION

The *Connections 2040 Plan for Greater Philadelphia* (“*Connections 2040*” or “the Plan”) outlines a long-range vision for the future of the Greater Philadelphia region. This vision is based on a thorough review and analysis of trends and forecasts, as well as extensive public and stakeholder outreach. It is an update of *Connections – The Regional Plan for a Sustainable Future* (“*Connections 2035*”). *Connections 2040* maintains the four core principles from the *Connections 2035* Plan, and, where appropriate, revises and expands them.



Connections 2040 focuses on the challenges of rebuilding our transportation infrastructure. The nation and this region are at a critical juncture with declining transportation funding and increasing needs to maintain and improve facilities. This poses a significant challenge for this region, due to the accelerating age of our system.

DVRPC

The Delaware Valley Regional Planning Commission (DVRPC) is the federally designated Metropolitan Planning Organization (MPO) for the nine-county Greater Philadelphia region. DVRPC covers Bucks, Chester, Delaware, Montgomery, and Philadelphia counties in Pennsylvania, and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. DVRPC’s mission is to plan for the orderly growth and development of the

region in concert with multiple planning partners. 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.

THE LONG-RANGE PLAN

As the region’s MPO, DVRPC is required by the U.S. Department of Transportation, in accordance with federal planning regulations,

to develop a long-range transportation plan that covers a minimum 20-year planning horizon. The Plan has been developed through a comprehensive, cooperative, continuing, coordinated, and compatible process. It incorporates the eight key planning factors contained in the federal transportation planning regulations. These factors are:

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

The Plan serves as a blueprint for the prioritization and funding of capital transportation investments for the region. Realizing the integrated and holistic relationship between transportation and the built environment, DVRPC has expanded

the scope of the long-range plan to also consider land use, the environment, and economic development activities and issues.

THE CONNECTIONS 2040 PLAN

Federal planning regulations require that the long-range plan be updated every four years. The *Connections 2040* Plan was adopted by the DVRPC Board on July 25, 2013, and serves as an update of the previous long-range plan, *Connections – The Regional Plan for a Sustainable Future*. The Plan was developed around four core, integrated principles:

- ▶ Manage Growth and Protect the Environment;
- ▶ Create Livable Communities;
- ▶ Build the Economy; and
- ▶ Establish a Modern, Multimodal Transportation System.

The concept of sustainability is a key policy principle that is woven throughout the 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.

The Plan sets a number of goals to ensure a sustainable future and outlines what investments and policy steps the region will need to make over the life of the Plan to achieve the vision.

Connections 2040 introduces several new elements to the long-range planning process. This Plan contains the most in-depth transportation system needs analysis for the region, conducted to date. This quantification of need further highlights the gap between available funding and what is required to rebuild and maintain our transportation system. The funding gap and how we prioritize projects has become a focus of this update. The Plan also includes more extensive economic development goals, which align with the region's Comprehensive Economic Development Strategy. *Connections 2040* maintains an emphasis on creating a more sustainable and equitable future, but also promotes innovation as a policy, specifically in terms of delivering goods and services in a more efficient manner.

SUSTAINABILITY, EQUITY AND INNOVATION



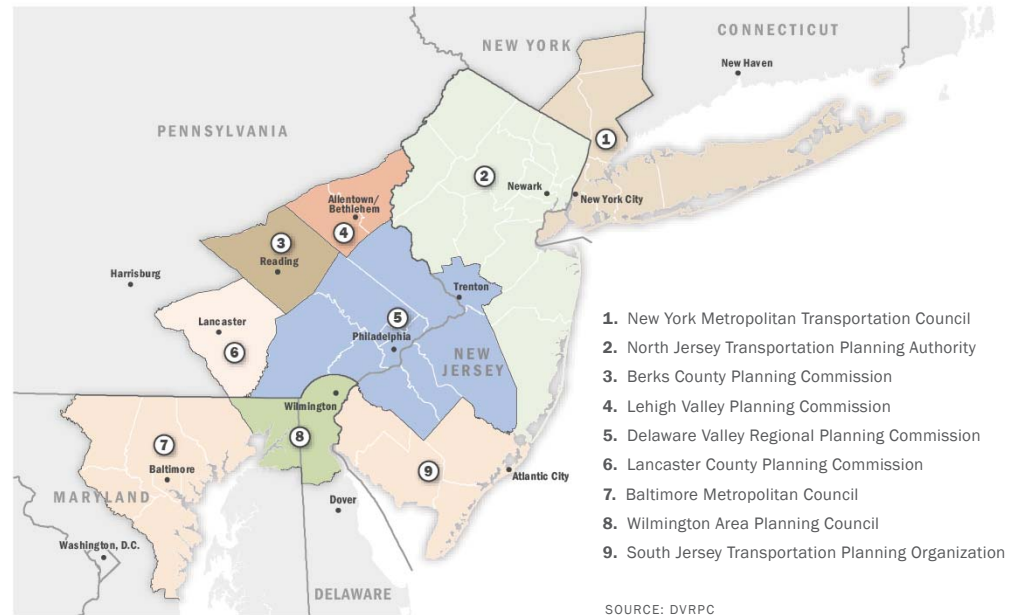
Sustainability, equity, and innovation are critical to achieving the goals of the Plan and are themes that are interwoven throughout the Plan. Each section of the Plan contains call-out boxes that highlight programs or approaches that help forward these elements. Innovation, in particular, will be an important factor moving forward, as we try to gain increased efficiencies in the face of intensifying fiscal constraint.

MEGAREGIONAL PLANNING & PLAN CONSISTENCY

DVRPC's long-range plans and planning process strive to be consistent with and complementary to the goals and policies of the plans and programs of member municipal and county governments, the New Jersey State Strategic Plan, and the statewide transportation plans of the Pennsylvania and New Jersey departments of transportation.

There are many planning issues that extend beyond an MPO's boundary, such as

FIGURE 1: METROPOLITAN PLANNING ORGANIZATIONS IN THE PLANNING AT THE EDGE FORUM



transportation system expansion projects, sprawling development patterns, climate change, air quality, energy reliance, and transportation funding. DVRPC works with surrounding MPOs to identify cross-boundary issues and explore ways to address them, both formally and informally, through enhanced coordination and communication with the pertinent statewide planning and operating agencies. This effort is carried out under the auspices of the Planning at the Edge Forum.

STAKEHOLDER & PUBLIC OUTREACH

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, agency, and organization representatives in specific fields, including the: Public Participation

Task Force; Regional Technical Committee; Regional Aviation Committee; Transportation Operations Task Force; Central Jersey Transportation Forum; Planning at the Edge Forum; Goods Movement Task Force; Regional Community and Economic

Development Forum; Information Resources Exchange Group; Regional Safety Task Force; and Pennsylvania and New Jersey Open Space Advisory Committees. Much of this Plan was formalized with contributions from each of these groups.

DVRPC also collaborated with business and economic development groups, environmental and transportation advocacy groups, regional planning partners, and the general public in developing the Plan. 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 Public Participation Task Force (PPTF) is



SOURCE: DVRPC

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 PPTF has been involved throughout the development of the Plan.

During the development of the *Connections 2040* 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.

A key component of this outreach effort was a web application, called *Choices & Voices*, which allowed users to create their own future development scenario, develop a budget, and then decide what types of transportation investments to make in the region. Based on their choices, they could see the impact their scenario had on future land development, energy use, congestion, and bridge and road maintenance needs. A transportation investment campaign, called *Which Way Now? – Investing in Our Roads, Rails, and Region*, was also launched to provide information on funding sources and needs. The *Connections 2040 Update* and *Which Way Now?* newsletters provided an update of various long-range planning activities and transportation system needs, respectively. Staff also conducted numerous outreach meetings throughout the region to gather public 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 of the Plan.

EXAMPLES OF CONNECTIONS 2040 OUTREACH EFFORTS



LEFT: Choices & Voices web application | MIDDLE: Which Way Now? awareness campaign | RIGHT: Connections 2040 Update e-newsletter

SOURCE: DVRPC

EQUITY & OPPORTUNITY

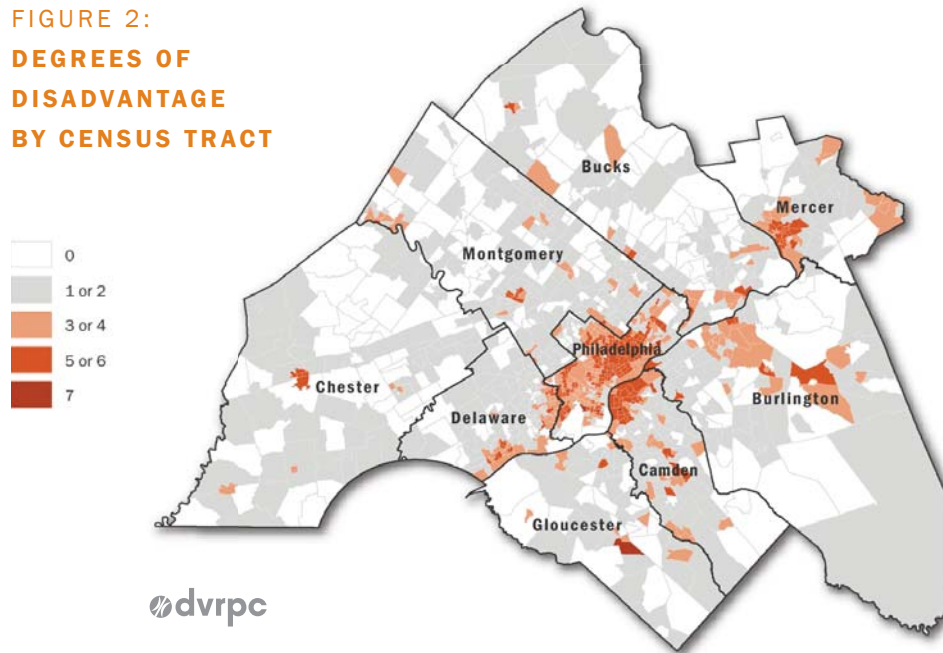
Title VI of the Civil Rights Act of 1964 states that “no person in the United States shall, on the grounds of race, color, or national origin, be excluded from the participation of, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial 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 Transportation Improvement Program 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.
- A commitment to Title VI and EJ has, and continues to be, reflected in DVRPC plans and programs, public involvement efforts, and general way of doing business.

**FIGURE 2:
DEGREES OF
DISADVANTAGE
BY CENSUS TRACT**



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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 and maps the

following populations, which may have unique planning-related challenges, using 2010 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 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.

The work undertaken by DVRPC inherently includes opportunities for EJ considerations and promotes 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)

LIBERTY

are designed to positively affect various disadvantaged 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 *Connections 2040* further 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 accessibility of the region's transportation system, and upgrading transit, bicycle, and pedestrian facilities, are just a few of the recommendations to improve the quality of life for all residents of the region.



PHOTO: J. FUSCO FOR OPTIMA

02 | TRENDS & FORECASTS

The first step in determining a future vision for the region is taking stock of our current opportunities and challenges. DVRPC continuously monitors various trends and forecasts to determine the current state of the region, as well as identifying concerns and ideas for the future. These factors will impact not only the collective vision for 2040, but also the specific issues that are covered in the Plan.

POPULATION & EMPLOYMENT FORECASTS

Population and employment forecasts are a critical component of long-range land use and transportation planning. The 2040 population and employment forecasts incorporate the results of the 2010 decennial Census and account for the ongoing economic recession. DVRPC worked with its member counties in developing the forecasts, which were adopted by the DVRPC Board.

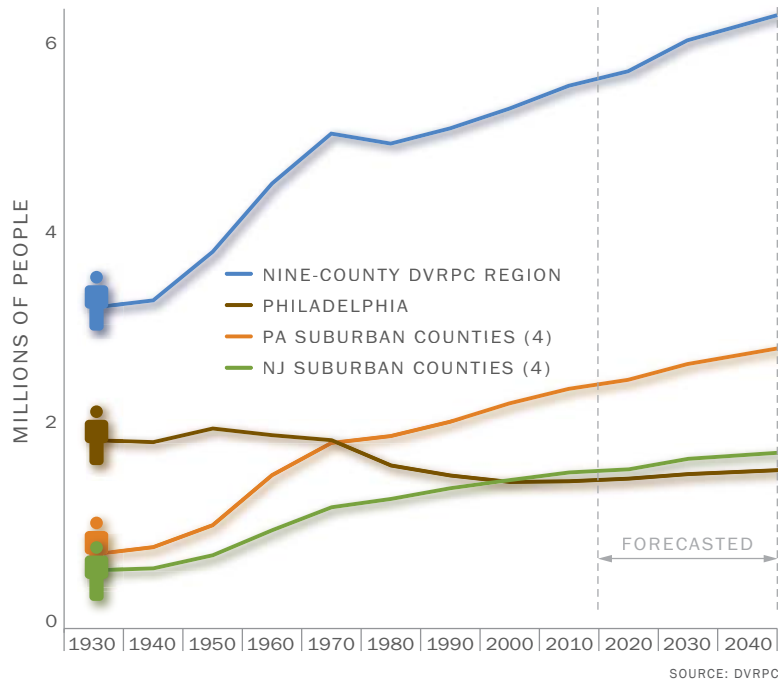
TABLE 1: 2040 COUNTY POPULATION FORECAST



| COUNTY | 2010 POPULATION | 2040 POPULATION FORECAST | FORECASTED ABSOLUTE CHANGE 2010-2040 | FORECASTED PERCENT CHANGE 2010-2040 |
|-------------------------------|------------------|--------------------------|--------------------------------------|-------------------------------------|
| Bucks County | 625,249 | 727,150 | 101,901 | 16.3% |
| Chester County | 498,886 | 647,330 | 148,444 | 29.8% |
| Delaware County | 558,979 | 569,982 | 11,003 | 2.0% |
| Montgomery County | 799,874 | 896,741 | 96,867 | 12.1% |
| Philadelphia County | 1,526,006 | 1,630,589 | 104,583 | 6.9% |
| Pennsylvania Subregion | 4,008,994 | 4,471,792 | 462,798 | 11.5% |
| Burlington County | 448,734 | 494,732 | 45,998 | 10.3% |
| Camden County | 513,657 | 528,303 | 14,646 | 2.9% |
| Gloucester County | 288,288 | 376,117 | 87,829 | 30.5% |
| Mercer County | 366,513 | 390,729 | 24,216 | 6.6% |
| New Jersey Subregion | 1,617,192 | 1,789,881 | 172,689 | 10.7% |
| DVRPC REGION TOTAL | 5,626,186 | 6,261,673 | 635,487 | 11.3% |

SOURCE: DVRPC

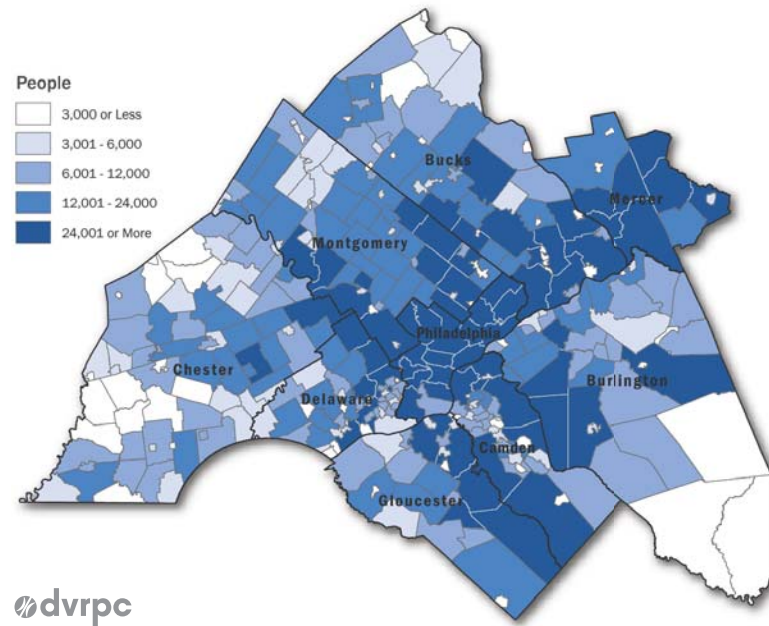
FIGURE 3: REGIONAL POPULATION (1930-2040)



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FIGURE 4:
2040 MUNICIPAL POPULATION FORECAST



The DVRPC region is forecast to gain over 630,000 residents between 2010 and 2040, an 11 percent increase.

The region's five southeastern Pennsylvania counties are forecast to experience an 11.5 percent increase in population, while the four New Jersey counties are expected to increase by 10.7 percent. Much of this forecasted growth is concentrated in the suburbs. The largest percent increases are forecast in Gloucester County, New Jersey, and Chester County, Pennsylvania, both of which are expected to increase by approximately 30 percent. The largest

absolute increase in population is forecast for Chester County, expected to gain over 148,000 residents and surpass Delaware and Camden counties by 2040 to become the region's fourth most populous county. Other counties forecast to see a significant number of additional residents include Philadelphia (+ 104,583 residents), Bucks (+ 101,901 residents), and Montgomery (+ 94,612 residents) counties.



FIGURE 5:
ABSOLUTE POPULATION CHANGE (2010-2040)

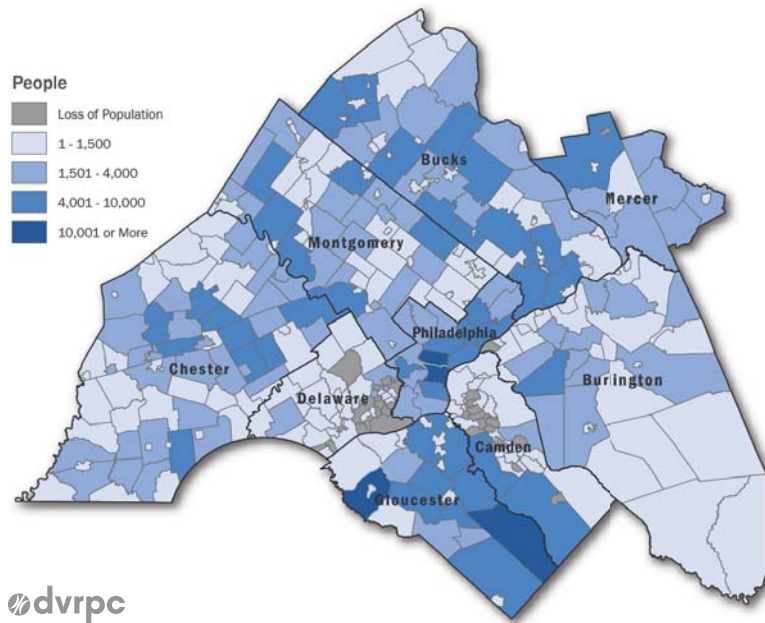
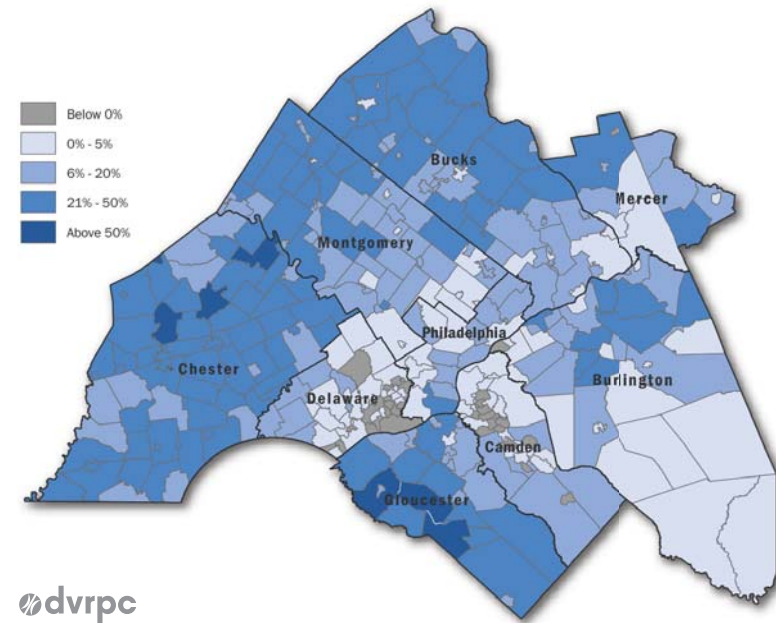


FIGURE 6:
PERCENT POPULATION CHANGE (2010-2040)



For the first time since 1950, the City of Philadelphia gained residents over the last decade. This trend is forecast to continue, with the City’s population expected to increase by almost 7 percent by 2040. The share of the region’s population living in the City, however, is expected to decline slightly, from 27 percent in 2010 to 26 percent by 2040.

The highest growth is forecast to continue on the periphery of the region with slower growth in the region’s core. This development pattern has required building additional transportation, sewer, water and other infrastructure, while underutilizing already built facilities.

The forecasts are what we can expect to occur in the future based on current programs and patterns. The Plan includes policies and strategies that may ultimately impact actual population and employment in the region.



THE REGION'S POPULATION



AND EMPLOYMENT

ARE BOTH FORECAST TO INCREASE BY

↑ 11% BY 2040



FIGURE 7:
2040 MUNICIPAL EMPLOYMENT FORECAST

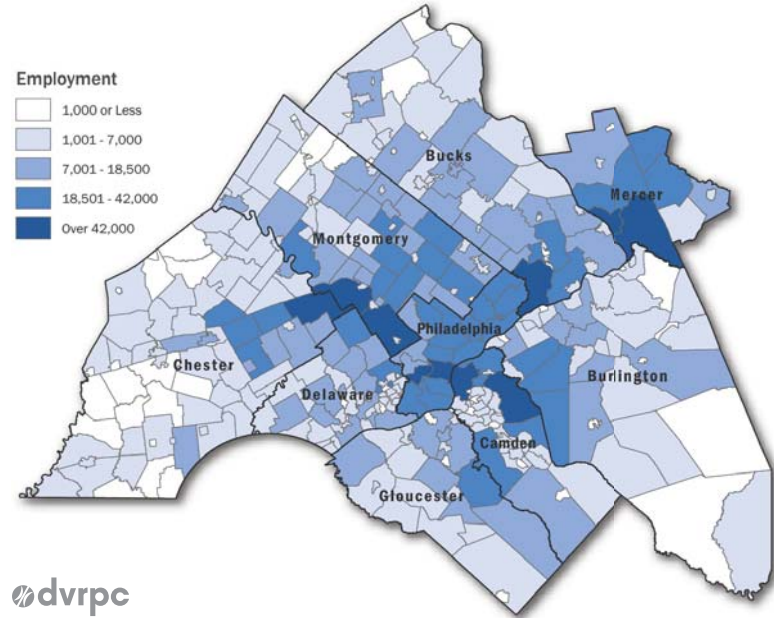


TABLE 2: 2040 COUNTY EMPLOYMENT FORECAST



| COUNTY | 2010 EMPLOYMENT | 2040 EMPLOYMENT FORECAST | FORECASTED ABSOLUTE CHANGE 2010-2040 | FORECASTED PERCENT CHANGE 2010-2040 |
|-------------------------------|------------------|--------------------------|--------------------------------------|-------------------------------------|
| Bucks County | 293,325 | 335,747 | 42,422 | 14.5% |
| Chester County | 292,015 | 368,022 | 76,007 | 26.0% |
| Delaware County | 238,488 | 243,655 | 5,167 | 2.2% |
| Montgomery County | 542,264 | 605,507 | 63,243 | 11.7% |
| Philadelphia County | 720,837 | 769,711 | 48,874 | 6.8% |
| Pennsylvania Subregion | 2,086,929 | 2,322,642 | 235,713 | 11.3% |
| Burlington County | 217,229 | 239,414 | 22,185 | 10.2% |
| Camden County | 263,406 | 274,124 | 10,718 | 4.1% |
| Gloucester County | 116,151 | 146,614 | 30,463 | 26.2% |
| Mercer County | 266,672 | 286,087 | 19,415 | 7.3% |
| New Jersey Subregion | 863,458 | 946,239 | 82,781 | 9.6% |
| DVRPC REGION TOTAL | 2,950,387 | 3,268,881 | 318,494 | 10.8% |

SOURCE: DVRPC



FIGURE 8:
ABSOLUTE EMPLOYMENT CHANGE (2010-2040)

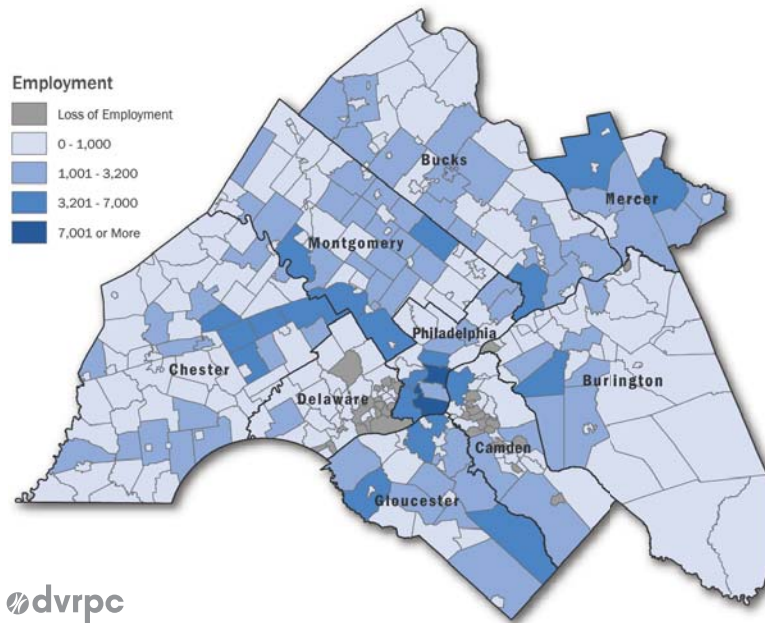
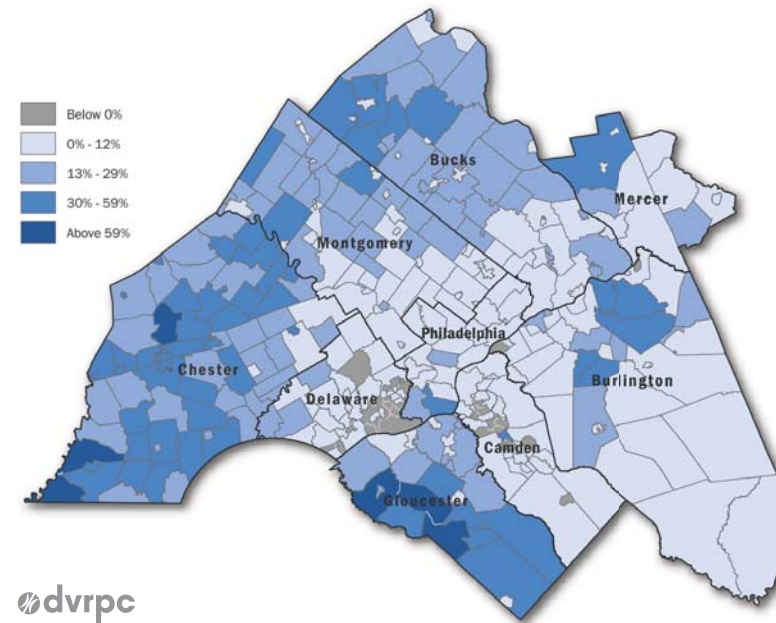


FIGURE 9:
PERCENT EMPLOYMENT CHANGE (2010-2040)



The DVRPC region is forecast to gain over 318,000 jobs between 2010 and 2040, an increase of almost 11 percent.

The region’s five southeastern Pennsylvania counties are forecast to experience an 11.3 percent increase in employment, while employment in the four New Jersey counties is expected to increase by 9.6 percent.

The largest percent increases are forecast in Gloucester County, New Jersey, and Chester County, Pennsylvania, where employment is forecast to increase by over 26 percent. The largest absolute increase is forecast for Chester County, expected to gain over 76,000 employees. Other counties forecast to see a significant number of additional employees include Montgomery County (+ 63,243 employees) and Philadelphia (+ 48,874 employees). Both Philadelphia

and Camden City, New Jersey, are forecast to gain employment, with forecasted percentage increases of 6.8 percent and 7.7 percent, respectively. The region’s other two Core Cities are expected to see their employment stabilize, with a net gain of 214 jobs in Trenton, New Jersey, and a gain of 89 jobs in Chester City, Pennsylvania. Similar to future population trends, the highest employment growth is forecast to occur on the outer edges of the region.

The Impact of Changing Demographics

Changing demographics will have a profound impact on lifestyle preferences and travel trends in the coming years. The region's largest demographic group is the baby boomers, born between 1946 and 1964 and reaching retirement age between now and 2030. Today's boomers are different from previous generations — not only are there more of them than ever before, but they also are more diverse and mobile and expect a range of housing and transportation options that will keep them independent and living at home for as long as possible.

Some of these retirees may prefer to live in the region's centers, provided there are affordable housing options available to them in desirable, safe neighborhoods. Many of them, however, expect to remain where they have spent most of their life: in the auto-dependent suburbs. Over time the ability to drive safely decreases and accessing goods and services can become difficult. Mixed-use communities that are walkable, bikable, and accessible by public transit can enhance the quality of life and

improve access to necessary services for all residents, including the elderly.

The next largest demographic group is the millennials, ages 16 to 34. This group is tech savvy, often shopping and banking on-line and communicating with friends via text, e-mail, and social media. Having grown up in an era of high gasoline prices, their travel habits are different than previous generations — they typically make fewer driving trips, are more amenable to public transit, are more likely to walk or use alternative modes (including scooters, skateboards, and bicycles), and are more likely to prefer to live in compact, walkable places. As they enter the workforce, many may look to telecommute. Between 2030 and 2040, today's millennials will be between the ages of 35 and 54 — traditionally the peak driving-age, but will in all likelihood be less auto dependent than previous generations.

The growth of the immigrant population will also have an impact on land use preferences and travel patterns. Research has shown that new immigrants have more children and at an earlier age, and often live in larger households with their extended family. They typically travel fewer miles,

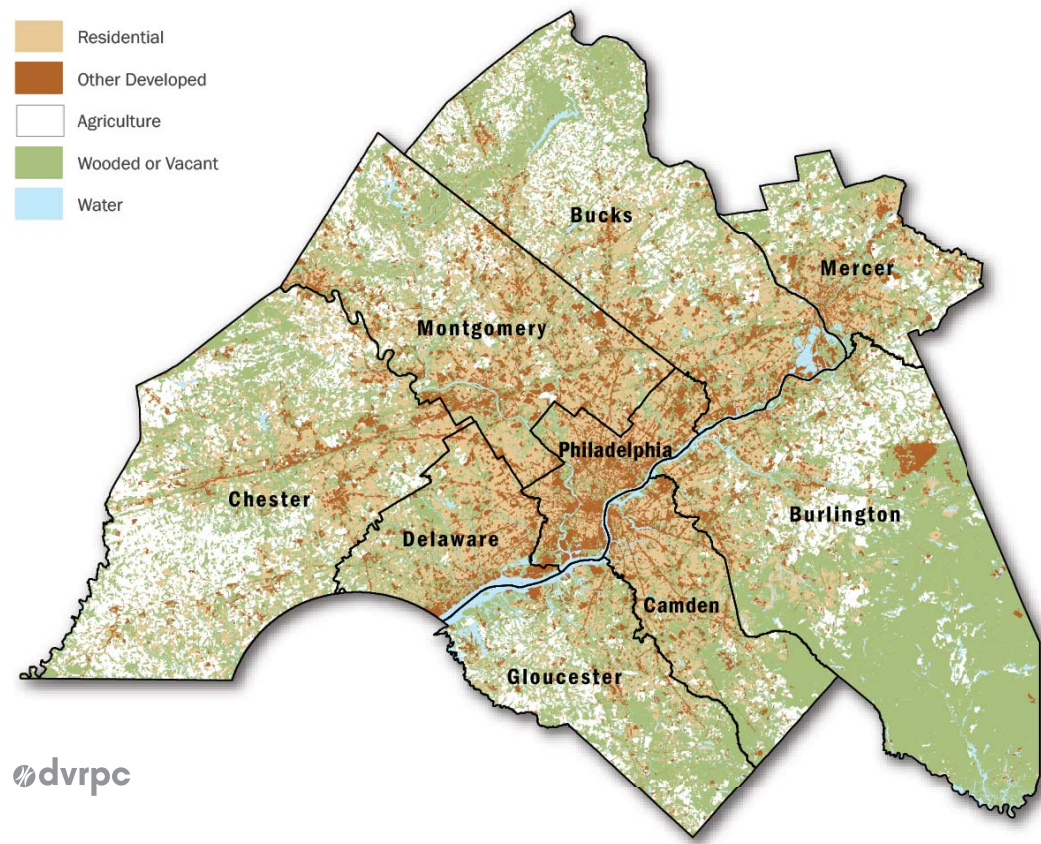
make fewer vehicle trips, and take transit, walk, and bike more. Hispanic immigrants are also more likely to car pool.

Changing demographics have already contributed to changing travel trends — transit use and commuting by walking or biking has increased and the number of annual miles driven, which had increased almost every year since the end of World War II, peaked in 2007 and has remained at about the same level since. Future long-range plans must track and respond to these trends — plans to enhance the driving experience should be revisited, and the focus should instead shift to expanding transit options and improving pedestrian and bicycle environments.

LAND USE

Land use analysis is another fundamental tool in the planning process. Over the past 80 years, the region has experienced a rapid suburbanization, characterized by 'leap frog' development and sprawl. Over this time period, population increased by 70 percent, but the amount of land consumed for development more than tripled. This has led to many negative externalities, including:

FIGURE 10: 2010 LAND USE



- ▶ Increased reliance on driving and congestion;
- ▶ A drastic reduction in open space and agricultural land;
- ▶ Detrimental impacts to air and water quality; and
- ▶ Increased need for infrastructure and services.

Development, particularly residential development, slowed between 2005 and 2010, compared to the previous five years, which was not unexpected, given the national and regional economic recession. Between 2005 and 2010, approximately 25,000 acres were developed regionwide, compared to almost 39,000 acres between 2000 and 2005. Residential acreage increased by approximately three percent between 2005 and 2010, compared to a five percent increase during the first half of the decade. This reduction in land consumption may, in part, be due to higher-density development and redevelopment in the region's Core Cities and Developed Communities. It may also reflect the impacts of the recession, as college graduates move back home, or the impact of immigration, since immigrants often live with extended families.

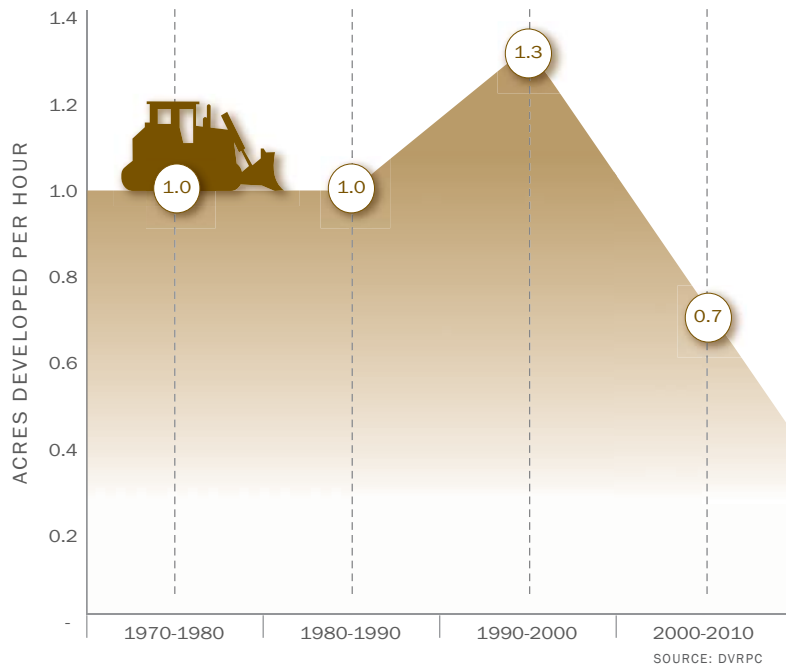
The rate of development between 2000 and 2010 slowed to nearly half the rate experienced in the previous three decades. From 1970 to 1990, development occurred at a rate of approximately one acre per hour; between 1990 and 2000, the rate accelerated to one acre every 45 minutes. Between 2000 and 2010, the rate slowed to approximately one acre of land developed every 82 minutes. However, this good news

was tempered by the fact that the region's population increased by approximately four percent between 2000 and 2010, but was still outpaced by the region's residential land area, which increased by over seven percent, or over 45,000 acres. At the same time, the DVRPC region lost over 57,000 acres of agricultural land area, and an additional 6,500 acres of other undeveloped areas, for a total loss of

almost 64,000 undeveloped acres. This compares to a loss of over 90,000 acres between 1990 and 2000. Since the slower rate of new-footprint development can be largely attributed to the economic recession, it is not certain that this pattern will continue as the economy recovers.

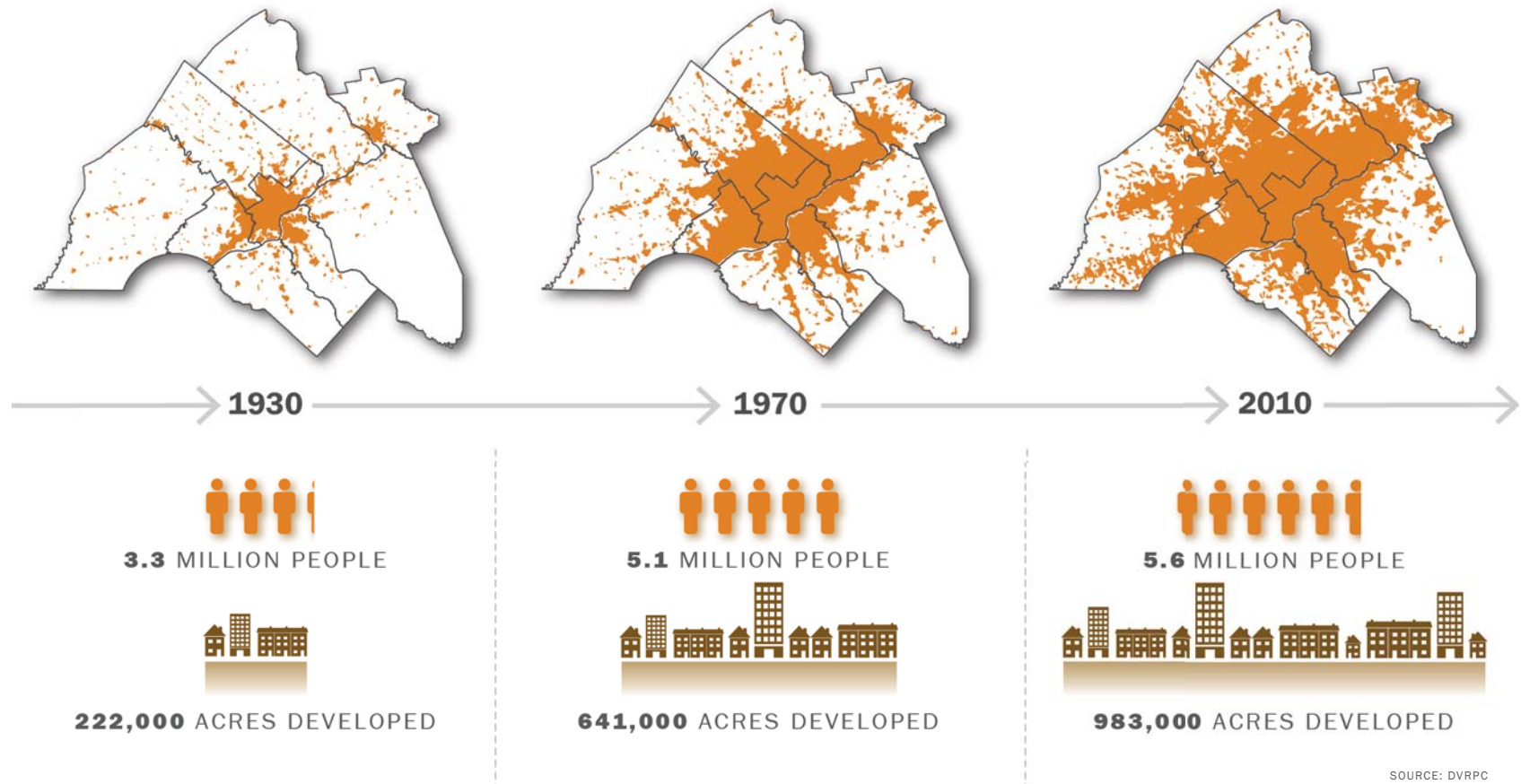
FIGURE 11: ACRES DEVELOPED PER HOUR (1970-2010)

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SOURCE: DVRPC

FIGURE 12: EXTENT OF REGIONAL DEVELOPMENT (1930-2010)



OPEN SPACE INVENTORY

DVRPC maintains an inventory of protected public and private open space in the region. The inventory tracks all publicly owned open

space, preserved farmland, and nonprofit protected open space. State, county, and municipal programs preserve farms by purchasing development rights with public funds. Nonprofits, such as land trusts and

conservancies, protect privately owned open space lands by purchasing easements or by acquiring land outright with a combination of public and private funds.



TABLE 3: 2011 OPEN SPACE INVENTORY (IN ACRES)

| COUNTY | FEDERAL | STATE | COUNTY | MUNICIPAL | NONPROFIT | PRESERVED FARMLAND | TOTAL PROTECTED OPEN SPACE | PERCENT OF TOTAL AREA |
|-------------------------------|----------------|------------------|-----------------|-----------------|-----------------|--------------------|----------------------------|-----------------------|
| Burlington | 2,652.8 | 155,657.7 | 2,954.4 | 12,650.3 | 6,799.1 | 31,033.6 | 211,748.0 | 40.4% |
| Camden | - | 19,326.5 | 3,016.6 | 5,094.3 | 425.1 | 1,902.7 | 29,765.3 | 20.5% |
| Gloucester | - | 9,359.2 | 2,091.3 | 5,821.1 | 1,301.3 | 14,940.8 | 33,513.7 | 15.6% |
| Mercer | - | 4,721.15 | 8,921.69 | 9,129.18 | 4,121.9 | 7,276.9 | 34,170.8 | 23.3% |
| New Jersey Subregion | 2,652.8 | 189,064.6 | 16,984.0 | 32,694.9 | 12,647.4 | 55,154.0 | 309,197.8 | 30.0% |
| Bucks | - | 12,626.5 | 9,121.4 | 23,505.8 | 11,853.7 | 16,436.7 | 73,544.0 | 18.5% |
| Chester | 1,289.8 | 8,583.6 | 5,743.2 | 10,750.1 | 49,443.6 | 30,982.1 | 106,792.4 | 22.0% |
| Delaware | 716.9 | 2,584.4 | 1,559.7 | 4,642.7 | 3,176.6 | 232.2 | 12,912.5 | 10.6% |
| Montgomery | 2,206.5 | 3,982.2 | 5,251.8 | 12,543.4 | 5,631.6 | 8,046.5 | 37,661.9 | 12.1% |
| Philadelphia | 366.2 | 279.9 | 9,871.1 | - | 517.9 | - | 11,035.0 | 12.1% |
| Pennsylvania Subregion | 4,579.4 | 28,056.6 | 31,547.2 | 51,442.0 | 70,623.4 | 55,697.5 | 241,945.8 | 17.2% |
| DVRPC REGION TOTAL | 7,232.2 | 217,121.2 | 48,531.2 | 84,136.9 | 83,270.8 | 110,851.5 | 551,143.6 | 22.6% |

SOURCE: DVRPC

Open Space Highlights and Trends

- ▶ Protected open space makes up 23 percent of the nine-county Greater Philadelphia region. This is divided into 15 percent public open space and 8 percent private open space.
- ▶ Across the region, the largest type of protected open space is state-owned land, which makes up 39 percent of all protected open space. This is followed by preserved farmland, which makes up 20 percent of all protected open space.

- ▶ The inventory of protected open space increased by 74,464 acres, or 16 percent, between 2007 and 2011. A portion of this increase may be due to data that was missing from the 2007 inventory.
- ▶ Preserved farmland, which increased by over 25,000 acres, had the largest gain in protected open space between 2007 and 2011.
- ▶ The county with the greatest rate of increase in land protection was Gloucester County, which saw a 51 percent increase in its protected open space.

- ▶ Burlington County has by far the greatest amount of protected open space, both in total acreage and as a percentage of the county, due primarily to land protection in the Pinelands.
- ▶ About 68 percent of the increase in protected open space was located in a Conservation Focus Area or the Greenspace Network, areas designated for preservation in the Plan.



FIGURE 13: REGIONAL AGRICULTURAL LAND

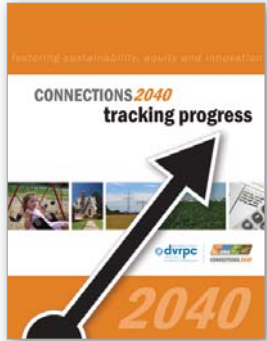


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FIGURE 14: REGIONAL PROTECTED LAND



TRACKING PROGRESS



As part of the long-range plan development process, DVRPC utilizes meaningful, reliable, and easy-to-replicate data to track

the region's progress toward the goals of the long-range plan and compiles the data in a *Tracking Progress* report (DVRPC publication #13044). Regional indicator data is used to highlight successful initiatives and to identify which issue areas should receive priority attention in the Plan update. *Tracking Progress* monitors 31 indicators, grouped under the four core principles of the Plan. Over half of the indicators show either mixed results or are moving in a positive direction.

Positive trends can be seen in economic indicators in the region, such as employment, workforce education, and average annual pay. Historically, these have been regional strengths. However, there is a growing economic disparity between the Core Cities and Developed Communities,

and the Growing Suburbs and Rural Areas in these factors. Likewise, the older, developed areas continue to experience slower growth in population, employment, and residential tax base.

Even though the rate of land development slowed in the latter half of the past decade, loss of prime agricultural soils and other natural resources continues to be a concern. This has played a role in the continued decline in surface water quality in the region. At the same time, open space preservation continues to be a success story in the region, with both public and privately protected spaces significantly increasing.

The trends for the transportation indicators are largely mixed. At a policy level, the region is successful at programming Transportation Improvement Program funds in regional Centers to support Plan goals. There has also been an increase in transit ridership in the region. A continuing lack of sufficient transportation funding is reflected in negative trends for the preservation and maintenance of bridge, road, and transit infrastructure. While the number of vehicle miles traveled is trending in a positive manner, commute time and the

percentage of commuters that drive alone is increasing in a negative direction.

A number of indicators are reflective of the economic recession between 2008 and 2010. When compared to the nation as a whole, the region fared well, or at least comparably, with other large metro areas during this time period. Indicators that were influenced by the recession include employment, freight movements, air passengers, land development, and mortgage lending. These indicators warrant monitoring as economic activity increases in the region and across the nation.

Based on a review of the indicators, *Connections 2040* will continue to place emphasis on directing future growth and development to the identified Plan Centers and away from rural resource lands. The Plan also incorporates an increased emphasis and analysis related to transportation system preservation needs and funding, particularly as part of the public outreach effort associated with the Plan.

FIGURE 15: TRACKING PROGRESS INDICATORS

| PLAN FACTORS | WHAT WE TRACK | TREND |
|--------------------------|---|-----------------|
| THE ENVIRONMENT | Is land development/land consumption slowing? | |
| | Did growth occur in appropriate areas? | |
| | Have acres of public open space increased? | |
| | Have acres of privately protected open space increased? | |
| | Is air quality improving? | |
| | Has surface water quality improved? | |
| COMMUNITIES | Is the population in Core Cities and Developed Communities increasing? | |
| | Is employment in Core Cities and Developed Communities increasing? | |
| | Has the tax base increased in Core Cities and Developed Communities? | |
| | Has residential construction activity increased in Core Cities and Developed Communities? | |
| | Has mortgage lending activity increased in Core Cities and Developed Communities increased? | |
| | Do development patterns support expanded transit options? | |
| ECONOMIC COMPETITIVENESS | Has the number of jobs in the region increased? | |
| | Has average annual pay in the region increased? | |
| | Is the workforce becoming more educated? | |
| | Is housing becoming more affordable? | |
| | Are greenhouse gas emissions lower? | |
| | Are we using less energy? | |
| | Has average annual pay in the region increased? | |
| TRANSPORTATION | Are people driving less? | |
| | Is transit ridership increasing? | |
| | Have vehicle fatalities declined? | |
| | Is congestion getting worse? | Data Incomplete |
| | Are fewer people driving to work alone? | |
| | Is commute time decreasing? | |
| | Has the number of deficient bridges decreased? | |
| | Are roads better maintained? | |
| | Is the transit system being maintained? | |
| | Is TIP investment in Plan Centers increasing? | |
| | Are freight shipments in the region increasing? | |
| | Is airline passenger traffic increasing? | |

SOURCE: DVRPC



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PHOTO: R. KENNEDY FOR GPTMC

03 | THE VISION FOR THE FUTURE

A central purpose of the Plan is to outline a future vision for the region. This forms a basis for defining goals and strategies to achieve the vision. The vision is based on identifying and analyzing 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. Trends provide a forecast of what we expect to happen if current events continue unabated. The Plan sets out a vision of what the region can attain, which in some instances is different than the trend-based projections. For instance, the Plan promotes additional growth in the region’s Core Cities and Developed Communities and less growth in Rural Areas, relative to the official 2040 population and employment forecasts.



The Plan’s vision calls for a more sustainable future that offers a superior quality of life by increasing mobility choices, preserving more open space, reinvigorating our existing communities, and reducing demand for energy. In this future, more compact,

mixed-use development will shorten distances between destinations and encourage alternative forms of transportation. Less energy use will help to reduce CO₂ emissions, making the region more sustainable and economically competitive.

By spending less on building new infrastructure ever farther out, more money can be invested in improving our existing core infrastructure. These benefits, like the four core principles outlined by the Plan, are inextricably linked.



Based on a review of trends and forecasts, as well as stakeholder and public input, *Connections 2040* continues the vision set forth four years ago in the preceding long-range plan, *Connections – The Regional Plan for a Sustainable Future*. The *Tracking Progress* indicators show positive movement in some directions and a continued slide in others. A greater collective effort will be needed going forward to fully achieve the Plan’s vision.

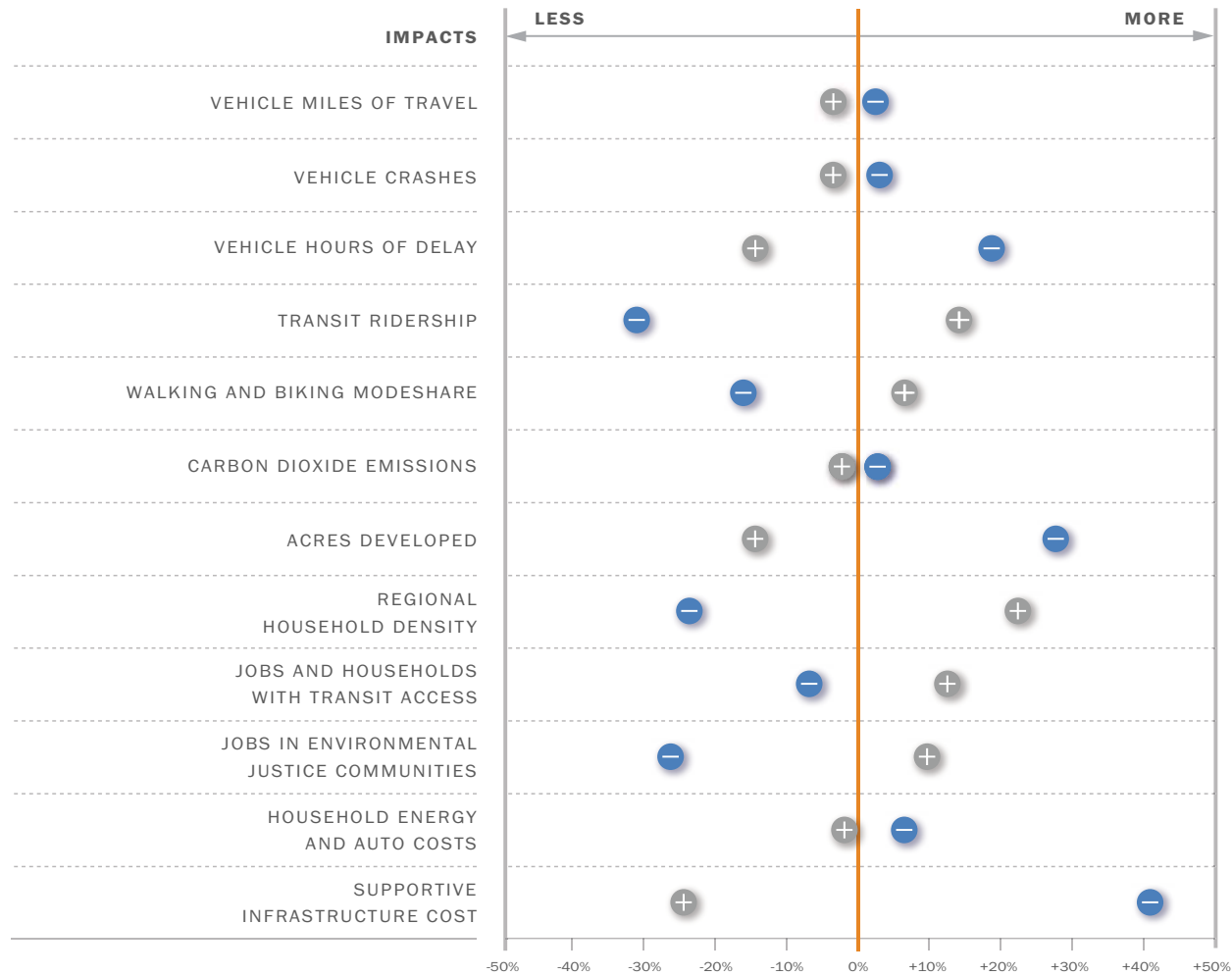
The vision was developed through the public outreach effort conducted for *Connections – The Regional Plan for a Sustainable Future*. DVRPC conducted a scenario planning exercise that presented a set of alternative futures to spur discussion on a vision for the region. The scenario planning exercise 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 adopted population and employment forecasts, served as a benchmark to the two extreme scenarios.

An extensive public outreach process broadened the dialogue to include as many varying views and ideas as possible. Responses from the outreach efforts largely supported the Recentralization scenario. While support for the principles underlying the Recentralization scenario was widespread, many commenters also expressed an opinion that the Recentralization scenario would not be able to adequately address future growth

in the region. Based on feedback from the stakeholders and the public, the future vision for the region that is outlined in the Plan incorporates many aspects of the Recentralization scenario. It augments that scenario with additional development outside the Core Cities and Developed Communities, but is focused in areas that are appropriate for future development. Such emerging 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. Public outreach conducted since the adoption of *Connections – The Regional Plan for a Sustainable Future*, and the results of a web application, called *Choices & Voices*, support the vision.

FIGURE 16: COMPARISON OF LAND DEVELOPMENT SCENARIOS



| TREND
● RECENTRALIZATION
● SPRAWL

Each indicator on the left shows its proportional change under different land development scenarios compared to the forecast in the trend. A plus sign within each dot indicates a better outcome for the region, a negative sign indicates a worse outcome for the region.

SOURCE: DVRPC



PHOTO: DVRPC

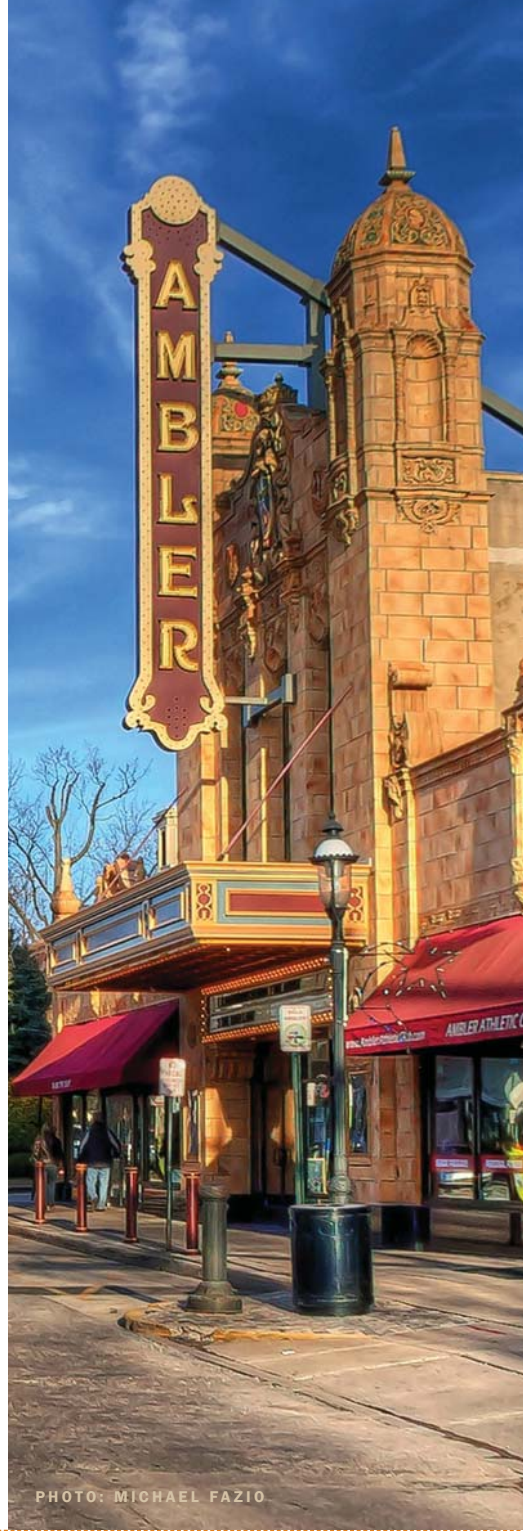
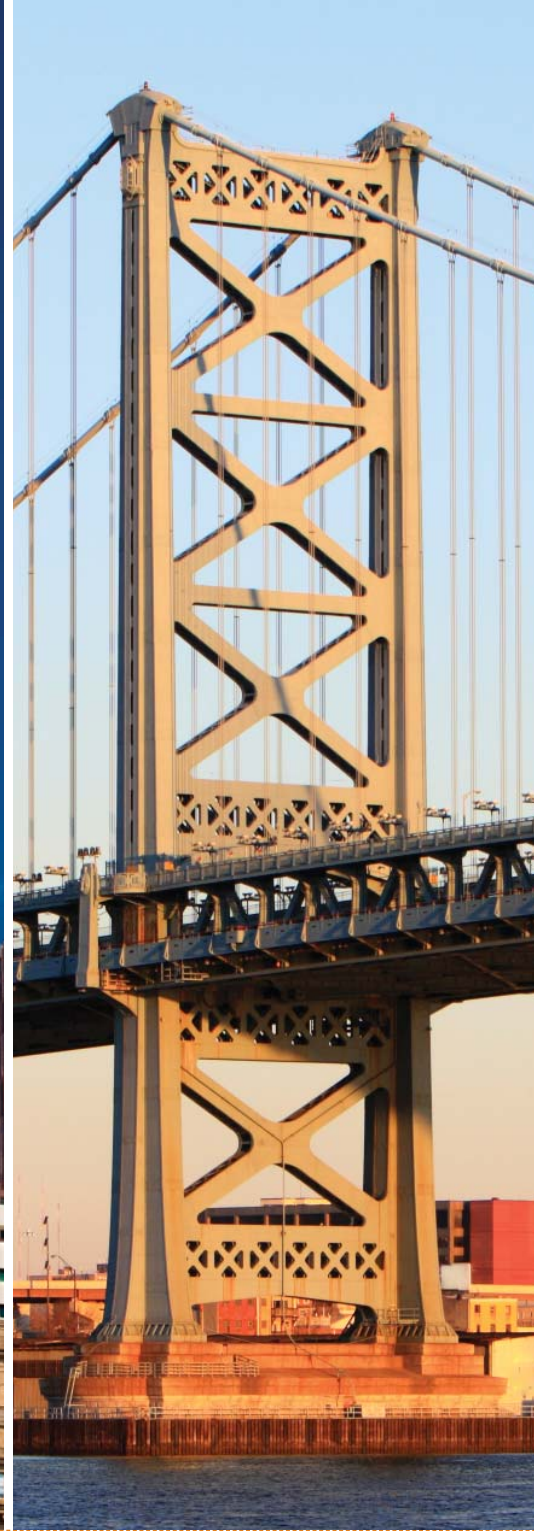


PHOTO: MICHAEL FAZIO



04 | CORE PLAN PRINCIPLES

Connections 2040 is built around four core principles to help achieve its vision.

- ▶ Manage Growth and Protect the Environment
- ▶ Create Livable Communities
- ▶ Build the Economy
- ▶ Establish a Modern Multimodal Transportation System

The four core principles are each related to one of the four factors considered in the Plan: the environment, communities, economic competitiveness, and transportation. Each core

principle is outlined in the following pages 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.

Since the principles are interrelated, strategies frequently pertain to multiple principles. For the sake of brevity, though, they are only listed under a single principle in the Plan.



**MANAGE GROWTH
& PROTECT THE
ENVIRONMENT**



**CREATE LIVABLE
COMMUNITIES**



BUILD THE ECONOMY



**ESTABLISH A MODERN
MULTIMODAL
TRANSPORTATION
SYSTEM**

PRINCIPLE:

MANAGE GROWTH & PROTECT THE ENVIRONMENT



Open space, natural areas, farmland, and historic resources are indispensable to our region and its residents. However, many of these resources are endangered by sprawling development patterns. *Connections 2040* recognizes that the continued loss of these resources is not sustainable, and the need to accelerate and coordinate growth management and resource protection activities is urgent.

Between 1970 and 2010, 345,000 acres of farms, fields, and forests were lost to development, an average of 24 acres each and every day for 40 years. The continued disappearance of these lands has resulted in significant negative consequences for our environment and our communities. Open spaces naturally maintain our air and water quality, support a thriving agricultural economy, offer habitat for wildlife, provide opportunities for recreation and healthy lifestyles, and are a cornerstone of our region's character and quality of life.

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DVRPC's Growth Management & Resource Protection Planning Philosophy

- ▶ Land use, growth, and resource protection must be integrated in a comprehensive, cooperative, continuing, and coordinated process.
- ▶ The regional land use vision will support the goals and policies of the DVRPC long-range plan.
- ▶ Growth should be encouraged in areas of existing development as infill and redevelopment, and discouraged in agricultural, natural, and rural areas.

THE ECONOMIC VALUE OF OPEN SPACE



A recent report commissioned by the GreenSpace Alliance and DVRPC and conducted by the Economy League of Greater Philadelphia and Econsult Solutions Corporation estimated the contribution of protected open space to the economy in southeastern Pennsylvania. The 2011 report, *Return on Environment*, showed that payback to be huge: \$240 million in increased property tax revenue from higher home values; \$133 million per year in environmental services, such as flood mitigation, water supply and quality, and air pollution control; \$577 million per year in recreational use value; \$1.3 billion per year in health-related cost savings resulting from physical activity on protected open space; and \$300 million per year in annual earnings from jobs related to protected open space.

LAND USE VISION

The *Connections 2040* Land Use Vision defines a regional visualization for centers-based development and open space preservation. The Land Use Vision comprises five layers: a hierarchy of Centers, Infill and Redevelopment, Emerging Growth, Rural Resource Lands, and the 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, and most new growth is concentrated in identified Centers and as infill and redevelopment in areas previously developed. This centers-based/infill and redevelopment strategy is depicted with more detail on the Planning Areas and Centers map.

Of the 2.4 million acres in the region, the Plan proposes that one million acres are permanently preserved for natural resource protection, farmland preservation, outdoor recreation, and shaping and defining the region. These lands should be strategically located in the Greenspace Network and Rural Resource Lands to protect environmentally sensitive areas, create interconnected networks of forests and riparian corridors, and preserve key

agricultural areas. This open space system will enhance ecosystem health, improve water quality, provide abundant recreational opportunities, and strengthen the region's agricultural economy. With over 550,000 acres of protected lands in the region to date, the region is over halfway toward meeting this goal. To stay on target, one acre will need to be protected for every acre developed of the remaining 900,000 acres of undeveloped, unprotected land in the region.

GREENSPACE NETWORK

The 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.

The vision of the Greenspace Network is to permanently protect currently unprotected acres through acquisitions, easements, and land use regulations. The network



PHOTO: KELLY COLLINS

is broken down into approximately 100 distinct corridors. Each corridor is named to promote its identity and brand it as a unique preservation project.

The Greenspace Network reflects numerous regional high-priority environmental goals, including the need to maintain and improve surface water quality and protect large, intact ecosystems, such as the Pinelands, Highlands, and Big Woods.

Finally, the Greenspace Network is a blueprint for creating a system of landscape-scale green infrastructure interwoven throughout the region’s urban and suburban core. Relatively large-scale green resources in and adjacent to developed communities make them more attractive and appealing places to live, work, and play, boost property values, and encourage increased investment in our towns and cities.

RURAL RESOURCE LANDS AND CONSERVATION FOCUS AREAS

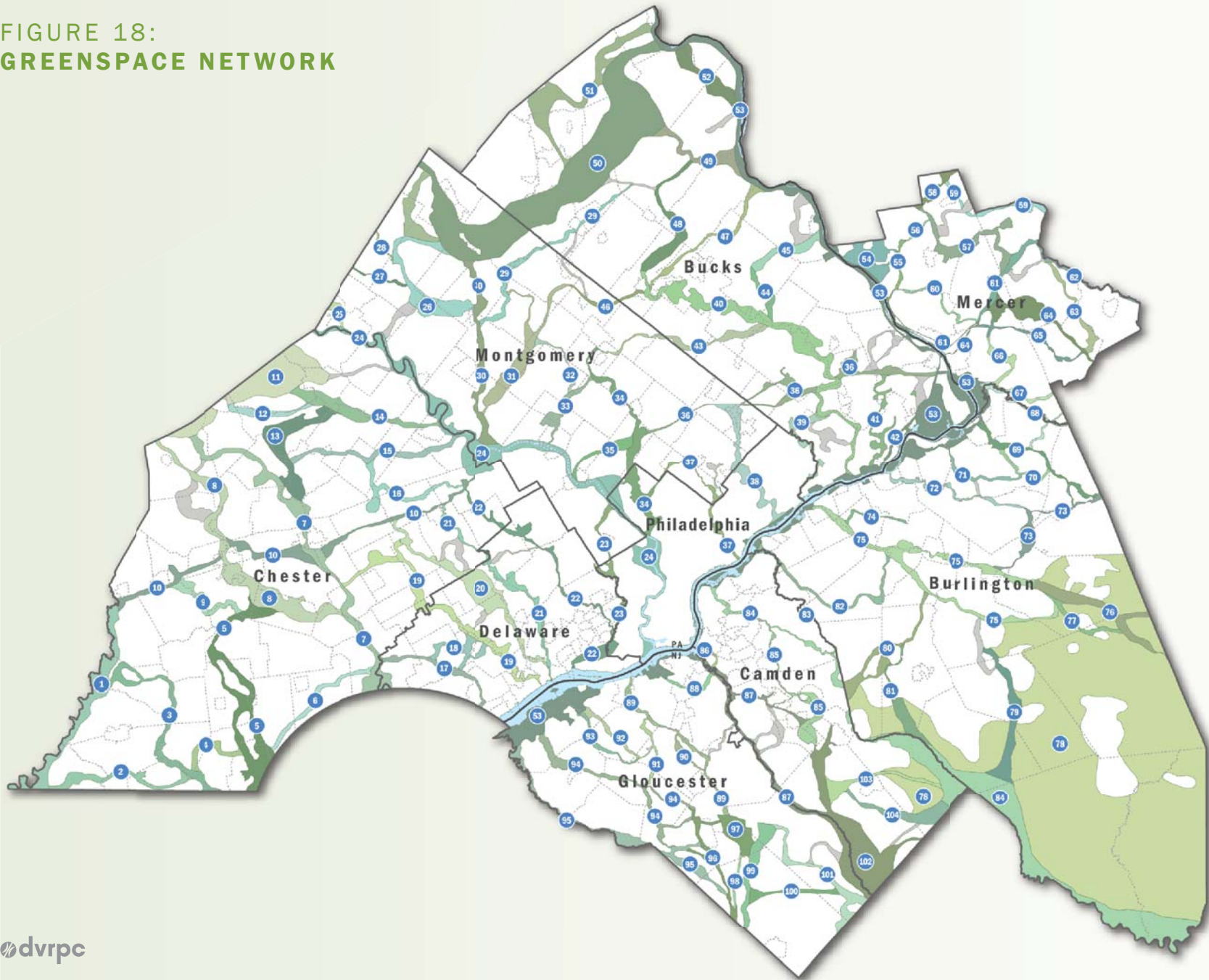
Rural Resource Lands depict agricultural, natural, and rural areas worthy of heightened preservation efforts by governments and nonprofit land trusts. Rural Resource Lands contain villages and scattered low-density development, but they remain mostly intact and their integrity can be maintained through strategic acquisitions and easements, land use regulations and good stewardship, and appropriate forms of growth. Rural Resource Lands are not “no-growth zones,” but instead are areas whose values can be protected, while allowing for limited growth that is in character with each region.

For planning purposes, the region’s Rural Resource Lands have been simplified and branded on the Conservation Focus Areas map. Examples include Chester County’s Big Woods and the New Jersey Pinelands. In general, the Conservation Focus Areas are either agricultural or natural in character. They often overlap with the Greenspace Network, but are larger and encompass scattered, low-density development sites, whereas the Greenspace Network is an unbroken system of naturally vegetated open space. Preserving unprotected open space and promoting context-sensitive, centers-based growth are key policy recommendations for both the Conservation Focus Areas and the Rural Resource Lands.

FIGURE 17: LAND USE VISION



FIGURE 18:
GREENSPACE NETWORK



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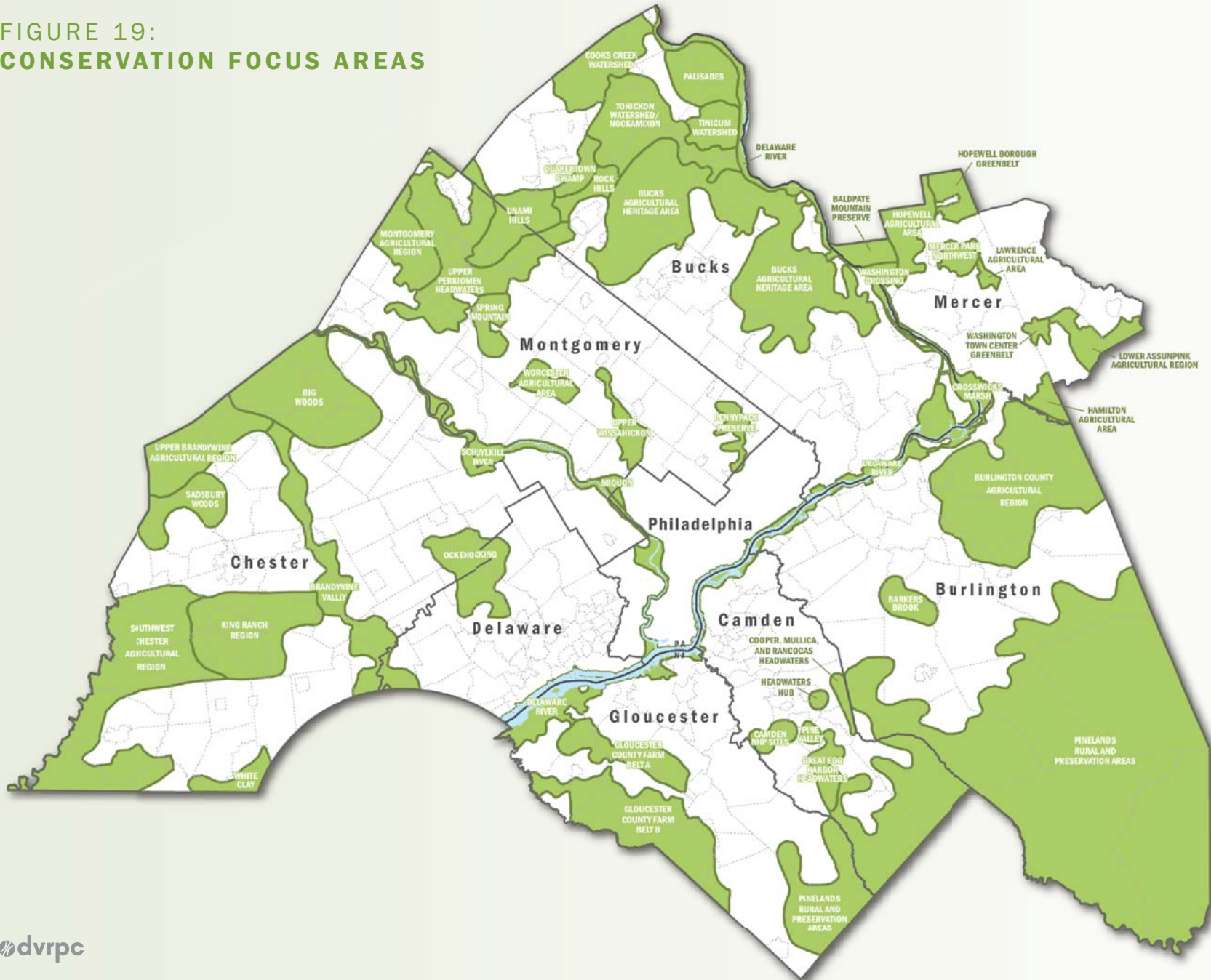


1. Octoraro Creek
2. Serpentine Barrens
3. Big Elk Creek
4. White Clay-Ways Run
5. White Clay Creek-Doe Run
6. Delaware Arc
7. Brandywine Creek
8. West Branch Brandywine Creek
9. Buck Run
10. Great Valley Ridgelines
11. Big Wood Corridor
12. Warwick-Elverson
13. Marsh Creek-Beaver Run
14. French Creek
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-Ivlyland
46. West Branch Neshaminy
47. Paunacussing-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
- Minor Connecting Greenspace Corridor

**FIGURE 19:
CONSERVATION FOCUS AREAS**



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Managing Growth and Protecting the Environment will provide the following benefits:



- ▶ **Limit the need for additional 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 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.**

- ▶ **Preserved farmland will strengthen the local agricultural industry, enhancing local food production at a time when demand for local food is increasing and rising energy prices are making long-distance food transport more costly.**
- ▶ **Prevent expansion of suburban development into rural communities to preserve agricultural character and heritage.**
- ▶ **Protect the context and integrity of historic sites and cultural landscapes that make the Greater Philadelphia region unique.**

PRESERVE OPEN SPACE



During the last several decades, Greater Philadelphia’s farms, fields, and natural areas 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 population growth.

This land consumption pattern has negative consequences for the environment, the transportation system, and the competitiveness of the regional economy.

The loss of healthy forested headwaters, riparian buffers, and naturally functioning floodplains increases storm water runoff; degrades water quality; fragments natural habitats; decreases biodiversity; and makes natural areas more susceptible to invasive plants and pests.

The consequences for local communities are costly: increased flooding; higher costs for clean drinking water; and decreases in soil productivity, nutrient cycling, and carbon storage. Farmland loss threatens the viability of the agricultural industry and reduces the availability of local food at a time when the demand for local food is experiencing

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, and limit opportunities for personal interaction with nature and green spaces.

Reversing the current land consumptive trend will require the use of growth management and open space preservation techniques. Strategic land preservation, market-based conservation, smart growth, and enhanced community design will be needed to manage growth and protect open space.

STRATEGIES TO PRESERVE OPEN SPACE

- ▶ Preserve and protect undeveloped lands through acquisitions, easements, market-based programs, and regulatory tools and techniques.
- ▶ Enact and implement local open space funding programs.
- ▶ Promote infill and redevelopment in Centers and existing developed areas.
- ▶ Promote compact, centers-based development through smart growth tools and techniques, such as: transit-oriented development (TOD); traditional neighborhood design (TND); designating official growth areas; and enhanced community design.
- ▶ For new residential projects in rural areas, encourage or require transfer of development rights programs, conservation subdivision design, and/or TND.

MANAGE STORMWATER AND IMPROVE WATER QUALITY



Open space loss and development have a detrimental effect on water quality. Nonpoint source pollution is generated by

stormwater runoff from streets, parking lots, driveways, buildings, lawns, and agricultural fields that lack adequate vegetative buffers. Examples of nonpoint source pollutants contained in runoff include: excess fertilizers, herbicides and insecticides from lawns and farms; oil, grease, rubber, salt, and toxic chemicals from parking lots and roadways; sediment from improperly managed construction sites; and bacteria and nutrients from livestock, pet wastes, and faulty septic systems.

Increased stormwater runoff volumes also degrade stream channel conditions. As an area becomes developed, stormwater is rapidly directed to streams from impervious surfaces, enlarging channels, eroding stream banks, lowering dry weather flows, raising temperatures, and decreasing the diversity of aquatic life.

STRATEGIES 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.
- ▶ Enact and enforce local ordinances to protect water quality, control stormwater, and control development in floodplains.
- ▶ Promote the use of community-scale green infrastructure, such as green streets, porous pavement, green roofs, rain gardens, bioswales, tree plantings, tree trenches, and naturalized retention basins to infiltrate stormwater, reduce flows, and improve water quality.
- ▶ Reduce impervious coverage by requiring maximum impervious coverage zoning standards; reducing parking surface through shared parking, parking maximum standards, and use of on-street parking; and right-sizing road widths.

REDUCE GREENHOUSE GAS EMISSIONS



The severe weather events and changes to our climate due to global warming pose threats to both the environment and the economy. Global warming is largely due to rising levels of greenhouse gases (GHGs) in the atmosphere. DVRPC's *Regional Greenhouse Gas Emissions and Energy Use Inventory* estimates that in 2010, the region produced 81.6 million metric

tons CO₂ equivalent of GHGs. This was roughly 1.2 percent of the U.S. total GHG emissions, about the same as the countries of Portugal and Austria, both of which have populations about two times that of the DVRPC region.

The Plan sets a target of reducing 2005 GHG emissions by 50 percent by the year 2035. A 60 percent reduction from 2005 GHG emissions levels by 2040 would keep the region on track to reach an 80 percent reduction by 2050. Achieving this goal will require significant coordinated action at the household, firm,

community, regional, state, national, and global level.

Reduced burning of fossil fuels means cleaner air and lower amounts of greenhouse gas emissions that lead to global warming. Maintaining and enhancing forests and soils that sequester (store) carbon is also important. For example, the trees located in the Hopewell Big Woods, a 73,000 acre mostly intact forestland on the border of Chester and Berks counties, store carbon valued at approximately \$18 million. (*Return on Environment, 2011*).

FIGURE 20: GREENHOUSE GAS EMISSIONS PER CAPITA BY MUNICIPALITY*

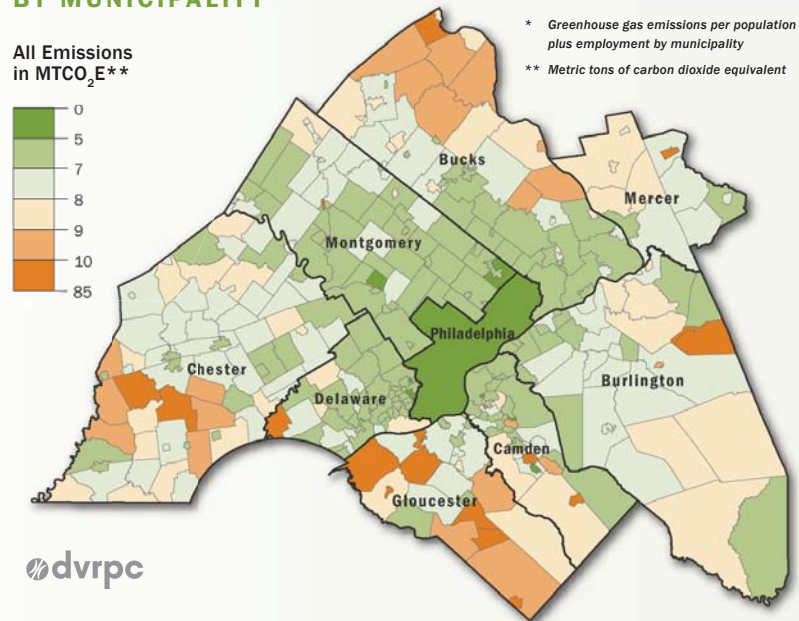
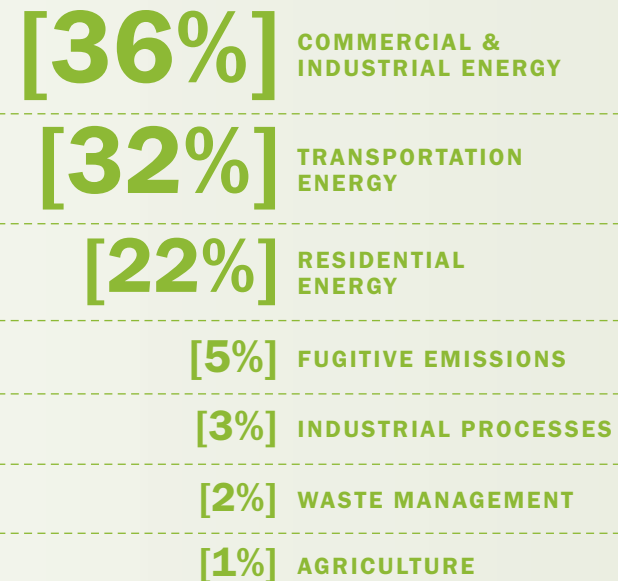


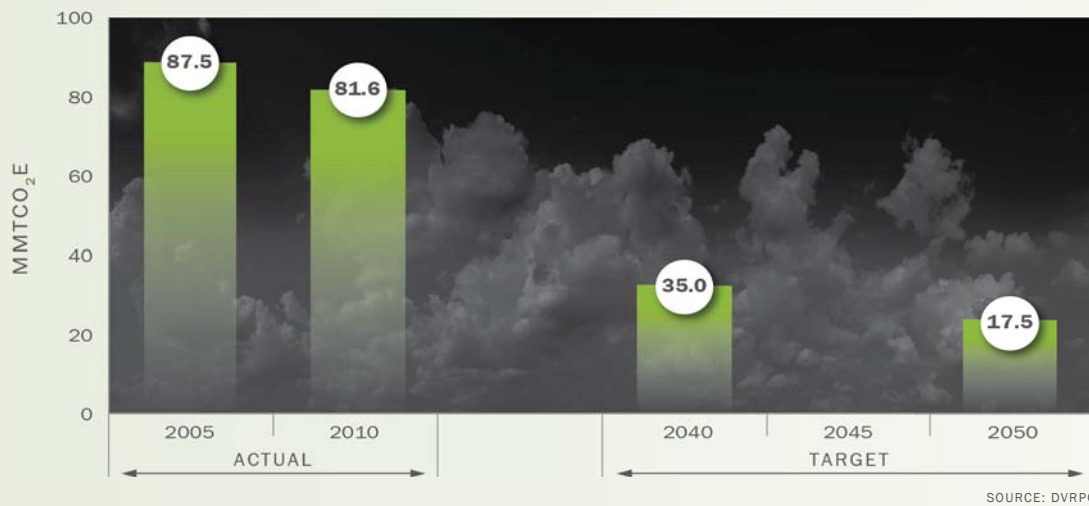
FIGURE 21: GREENHOUSE GAS EMISSIONS BY SECTOR



NOTE: Emissions do not add up to 100% due to rounding.

SOURCE: DVRPC

FIGURE 22: REGIONAL GREENHOUSE GAS EMISSIONS BY YEAR WITH TARGET



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Future land and housing development patterns in the region over the coming decades will also have a significant role in shaping future energy use and GHG emissions. As Figure 20 illustrates, those municipalities with walkable, mixed-use neighborhoods; near transit infrastructure; and with smaller houses, use less energy and produce lower GHG emissions per person plus employment. DVRPC’s transportation and land use planning policies, priorities, and projects are all aligned to advance these goals.

STRATEGIES TO REDUCE GREENHOUSE GAS EMISSIONS

- ▶ Promote energy efficiency.
- ▶ Produce energy with less CO₂ by promoting a move to low- and no-carbon fuels.
- ▶ Maintain healthy forest lands and promote additional tree plantings.
- ▶ Reduce the demand for transportation energy by locating jobs, housing, and services closer together and encouraging denser development.
- ▶ Municipalities should adopt alternative energy ordinances to ensure that alternative energy production is compatible with existing land uses in a community.

PREPARE COMMUNITIES FOR THE IMPACTS OF CLIMATE CHANGE



Climate change caused by global warming poses new threats and exacerbates existing hazards for communities throughout

Greater Philadelphia. Climate as we experience it today will shift, exposing the region and its residents to new dangers and heightened risks. More severe and more frequent storms, increased precipitation, sea level rise, and extreme heat will lead to increased flooding, wetland loss, erosion, short-term drought, heat-related stress, and loss of life and property.

Yesterday’s climate no longer provides a reliable guide for planning for the future. Communities must identify how expected changes in climate averages and extremes will exacerbate on-going threats and introduce new vulnerabilities. Only by doing so can the region begin to incorporate climate resilience into long-term planning and investment decisions. Fortunately, adapting to climate change will not require brand new efforts. Ongoing initiatives like green infrastructure, smart growth, floodplain management, ecological

restoration, asset management, and efforts to reduce the heat island effect will make our communities more resilient to climate-related threats. Communities can leverage these efforts by incorporating the best understanding of projected climate impacts into their plans and projects.

STRATEGIES TO PREPARE COMMUNITIES FOR THE IMPACTS OF CLIMATE CHANGE

- ▶ Incorporate existing and projected changes in the climate system at the regional and local scale into local plans and projects.
- ▶ Use climate projections, not historical precedents, to plan, maintain, and construct transportation system elements, such as pavements, bridges, drainage structures, catenaries, and rails.

- ▶ Incorporate green infrastructure into urban stormwater management systems to reduce flooding.
- ▶ Protect and restore vegetated riparian buffers, maintain naturally functioning floodplains, and enhance wetlands.
- ▶ Establish cooling centers for extreme heat days.



SUSTAINABILITY

CITY OF CHESTER CLIMATE INITIATIVES

In March 2012, the National Oceanic and Atmospheric Administration (NOAA) authorized DVRPC and PA Sea Grant to prepare a climate change vulnerability assessment and adaptation plan for the City of Chester. Over the course of two years, DVRPC and PA Sea Grant, along with the City of Chester, ICF International, the Delaware County Planning Department, the Partnership for the Delaware Estuary, and U.S. EPA will work together to develop a plan that will enable the city to assess the vulnerability of the natural and built environment and local populations to climate-related hazards, and recommend actions to increase community resiliency.

The program will develop planning tools, such as storm surge models, to help stakeholders assess Chester’s vulnerability to extreme weather events, such as downpours, hurricanes, and nor’easters. The plan will build off the city’s efforts to address “ongoing” challenges like improving water quality, managing stormwater, maintaining infrastructure, and redeveloping former industrial sites, while showing how adaptation actions can reinforce existing goals, like urban greening, improving air quality, mitigating disasters, and implementing smart growth. The project will bring the best available data, resources, and information to help the City of Chester make informed decisions and implement adaptation strategies and provide a case study for other municipalities in the region.

IMPROVE AIR QUALITY



The region continues to not 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. 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.

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. Fine particle pollution comes from a variety of natural and manmade sources, such as cars, power plants, and forest fires, and is a year-round problem. Fine particulate matter can cause

breathing problems and aggravate heart conditions.

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 promoting use of cleaner fuel-burning vehicles.

STRATEGIES TO IMPROVE AIR QUALITY

- ▶ Provide air quality forecasts to alert the public about poor air quality days and encourage voluntary measures to reduce air emissions, particularly on days when pollution is forecast to violate the standards.
- ▶ Advance strategies and projects that reduce motor vehicle emissions through trip reduction, alternative commute options, technology advancements for fuels and vehicles, and public policies that support cleaner fuels and emissions standards.
- ▶ Work with regional partners to reduce air pollution impacts on at-risk populations.

INCREASE LOCAL FOOD PRODUCTION AND DISTRIBUTION



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 development. Between 1990 and 2010, the DVRPC region lost over 146,000 acres of agricultural land.

Food system activities take up a significant amount of land and farmland in metropolitan areas, which are facing extreme development pressures. America

is experiencing rising incidences of both hunger and obesity. Many low-wealth areas have limited availability of healthy and affordable foods. The food we eat takes a considerable amount of fossil fuel energy to produce, process, transport, and dispose of. The food system represents an important part of the regional economy, and food manufacturing can provide much-needed jobs. Local food production, preparation, and distribution offer entrepreneurial opportunities, and agricultural products remain strong exports.

STRATEGIES TO INCREASE LOCAL FOOD PRODUCTION AND DISTRIBUTION

- ▶ Enhance coordination between all food system stakeholders, ranging from the private sector to the public sector, from sustainable agriculture 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.
- ▶ Increase food production on protected lands within the region.
- ▶ Facilitate local food production and increased access to healthy food in rural, suburban, and urban areas through planning activities, supportive land use ordinances, and innovative incentive programs.



EQUITY

BEGINNING FARMERS ACCESS TO FARMLAND

The Greater Philadelphia region is at the geographic heart of very active farmland preservation efforts in the states of New Jersey and Pennsylvania. Many farmland preservation programs are incorporating farm viability aspects: not only protecting the land, but also retaining the agricultural industry, transitioning ownership to a new generation, and supporting new farmers. At the same time, an increasing number of new and beginning farmers come from nonfarm backgrounds. These new and beginning farmers have trouble accessing farmland since more traditional, family farms are passed down from generation to generation.

Two nonprofit organizations, the Pennsylvania Association for Sustainable Agriculture (PASA) and the New Jersey chapter of the Northeast Organic Farming Association (NOFA-NJ), have developed programs to link new farmers with farmland and knowledge. PASA’s Farm Lease Connection uses a website and in-person networking events to connect new farmers or farmers looking to expand with interested landowners, who run the gambit between retiring farmers, to land trusts, to public agencies. NOFA-NJ’s Farm Incubator Program offers stipends for educational courses, business planning services, and mentoring, and will establish incubator farms on lands throughout New Jersey. Both programs are encouraging the next generation of farmers, who will become the stewards of agricultural lands, the producers of local food, and leaders in the regional economy.

PRESERVE HISTORIC RESOURCES AND CULTURAL LANDSCAPES



The region's rich past is reflected in the variety and number of historic and cultural resources.

From Native American archeological sites to early Swedish settlements, Independence Mall and the hallowed grounds of Valley Forge, Greater Philadelphia's history is incorporated into and enriches the fabric of present-day life. The wealth of resources is underscored by the number of historic landmarks, sites, and districts on the national register of historic places, state- and nationally recognized historic landscapes and heritage areas, and sites protected through local historic designations. Despite these efforts and activities, the region's historic and cultural resources are threatened by demolition, neglect, encroaching sprawl, incompatible land uses, poor planning, and insensitive design. While more sites are deemed eligible for the national register every year, there are still many significant sites that have not been identified, recorded, or protected. Nonprofit organizations, government agencies, and local governments are working to identify, protect, preserve, rehabilitate, and restore

the region's historic and cultural resources and landscapes as a way to increase livability, enhance "sense of place," and cultivate a unique identity.

Greater Philadelphia has layers of history, which can be unearthed by transportation projects. This can impact the integrity of historic, cultural, and archeological resources. Some historic resources, like bridges, are a part of the transportation system itself. There are several federal and state laws that were enacted to avoid and minimize these impacts and disturbances, including the National Environmental Policy Act (NEPA), Section 106 of the National Historic Preservation Act, Section 4(f) of the Department of Transportation Act, 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 during the planning, permitting, design, and construction of federally funded and licensed projects.

Since 2005, federal transportation regulations have established formal

consultation requirements for MPOs and state DOTs to work with environmental, regulatory, and resource agencies in the development of long-range transportation plans. DVRPC is already actively working with the Pennsylvania Historical and Museum Commission (PHMC) and is seeking to work more with New Jersey's State Historic Preservation Office (NJ SHPO) to more carefully consider historic and cultural resources in the planning and design of transportation projects. Additionally, DVRPC and PHMC are exploring how transportation projects can better support, rather than impair, local historic preservation and revitalization efforts.

STRATEGIES TO PRESERVE HISTORIC RESOURCES AND CULTURAL LANDSCAPES

- ▶ Support investment 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.
- ▶ Promote growth management and enhanced 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.



- ▶ Encourage open space and farmland preservation as a means to also preserve the scenic, historic, and cultural context of many historic sites in the region.
- ▶ With guidance from the state historic preservation offices (PHMC and NJ SHPO), create a historic resources screening tool to evaluate possible adverse impacts of transportation projects on historic and cultural resources.
- ▶ Investigate opportunities for advanced and alternative mitigation and mitigation banking to both speed transportation project delivery and incorporate a community's historic preservation priorities through the Section 106 review process.



INNOVATION

OPPORTUNITIES FOR ADVANCED AND ALTERNATIVE MITIGATIONS FOR TRANSPORTATION PROJECTS IN PENNSYLVANIA

DVRPC and the Pennsylvania Historical and Museum Commission (PHMC) have partnered to identify ways in which mitigation activities performed as part of transportation projects can more thoughtfully and effectively benefit historic resources and communities. This study is part of a larger strategic partnership between PHMC, FHWA, PennDOT, and regional planning organizations across the commonwealth to develop more thoughtful and progressive planning recommendations related to historic preservation. Working with a small advisory group of preservation professionals, transportation planners, and local stakeholders, DVRPC and PHMC have reviewed standard mitigation options for historic structures, such as context-sensitive design, scholarly research and recordation, and public education; as well as identified creative, alternative, and advanced mitigation options. These include pooling resources together for a larger surveying effort, or constructing new bridges that artistically reflect a location's history. DVRPC and PHMC are creating a proposal for mitigation banking that will enable both communities and agencies to think creatively about how a transportation improvement can achieve local preservation goals.

PRINCIPLE: CREATE LIVABLE COMMUNITIES



Our region is expected to gain over 630,000 residents by 2040, an increase of over 11 percent since 2010. Similarly, employment in the region is expected to increase by over 318,000 employees, also an 11 percent increase. If current trends continue, the 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 underutilize existing facilities, and contribute to the further disappearance of our open space and the depletion of our natural resources. Instead, these issues can be averted through focused investment and redevelopment to create more compact, mixed-use, livable communities within and around our region's established Centers.

These communities provide a unique sense of place, have existing infrastructure and institutions, and offer opportunities for new development and revitalization. Concentrating growth within and around 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.

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DVRPC's Centers-Based Planning Philosophy

- ▶ **Livable communities can be found throughout the region: in Core Cities and their component neighborhoods; in the region's older suburbs; and in town and rural Centers scattered throughout the region's suburbs and rural areas.**
- ▶ **Livable communities can be created and supported by investing in and redeveloping Centers, enhancing community design, promoting affordable housing in appropriate locations, promoting green infrastructure, and increasing parks and recreation opportunities.**
- ▶ **Connections 2040 envisions numerous thriving, compact, mixed-use Centers, where people intuitively want to live, work, and play.**
- ▶ **Investing in Centers will facilitate the most efficient use of infrastructure, conserve open space and natural resources, strengthen local economies, and create the densities needed to support walking, biking, and public transit.**

PLANNING AREAS

Greater Philadelphia is a complex mosaic of 352 diverse cities, boroughs, and townships. *Connections 2040* characterizes each of the region's municipalities as either a Core City, Developed Community, Growing Suburb, or Rural Area, as a means of categorizing the types of communities and defining the corresponding long-range planning policies most appropriate for each type. This categorization is shown on the Planning Areas and Centers map (Figure 24).

Many municipalities have areas within their boundaries that fit the characteristics of more than one of these Planning Area 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 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 for policy direction at the regional scale, actual approaches should always be guided by local conditions.

The region's four **Core Cities** are Philadelphia, Trenton, Camden, and Chester. 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 are places 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, offering affordable housing opportunities; 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; and have stagnant or declining tax bases that cannot keep pace with rising service demands. Rehabilitation and maintenance of infrastructure systems and the housing stock, and local economic and community development can help to reinforce location advantages, while stabilizing neighborhoods and stemming decline.

Growing Suburbs are communities that have a significant number of developable acres remaining and are experiencing or are forecast to experience significant population and/or employment growth. Key planning policies in these communities focus on the need to improve the form of development, reduce congestion, and mitigate the negative consequences of unmanaged growth, and include growth management and enhanced community design. Smart growth techniques that support a more concentrated development pattern (such as 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. The quality of design and architectural character of the built environment, open space preservation, and the creation of an integrated system of open space and recreation are all priorities in these communities.

Rural Areas include the region's agricultural communities and communities with large remaining natural areas. Key policy approaches for these communities focus on preservation and limiting development, and include limited expansion of infrastructure

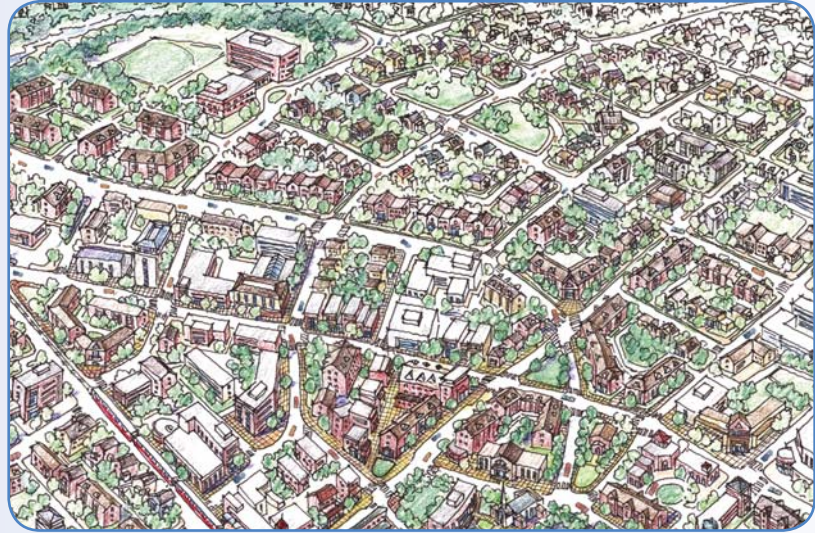
FIGURE 23: PLANNING AREAS

CORE CITIES



SOURCE: DVRPC

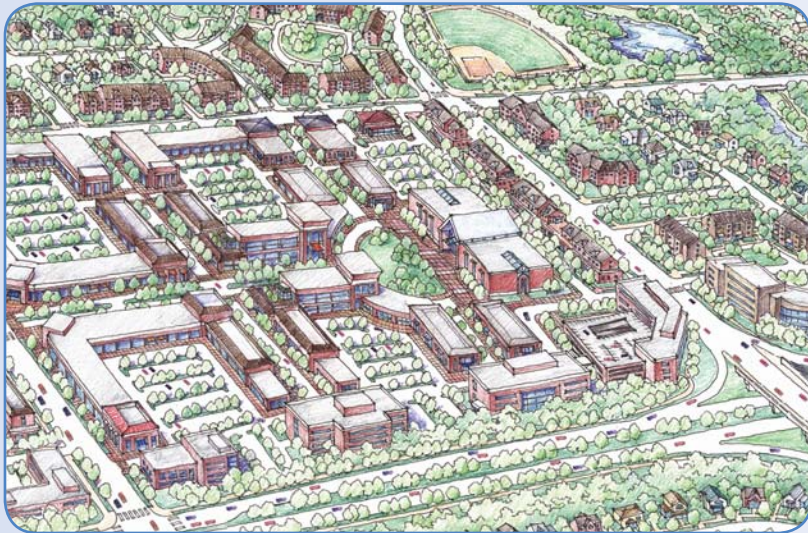
DEVELOPED COMMUNITIES



SOURCE: DVRPC

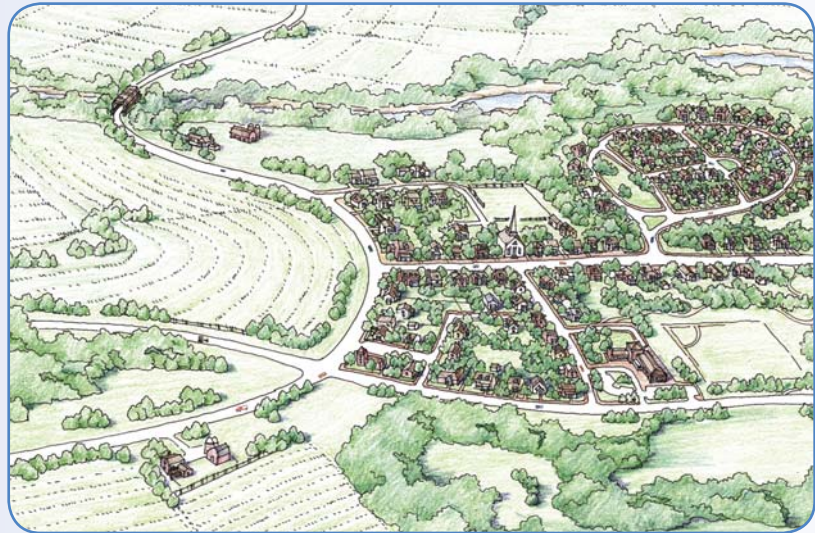
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GROWING SUBURBS



SOURCE: DVRPC

RURAL AREAS



SOURCE: DVRPC



PHOTO: KYLE KOBILKA

systems, preservation of a rural lifestyle and village character, support for continued farming, and enhanced natural resource protection. Livable communities in these areas include rural centers that have an identifiable main street, a mix of uses, higher densities than their surrounding uses, and a true sense of place.

Creating Livable Communities will provide the following benefits:



- ▶ **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.**
- ▶ **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 region's housing stock that is located near employment opportunities and public transit.**

MULTIMUNICIPAL PLANNING



DVRPC promotes and 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, zoning, 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.

INVEST IN CENTERS



The concept of Centers is the cornerstone of *Connections 2040*. Centers provide a focal point in the regional landscape

that recognizes the regional and local significance of places, while reinforcing a sense of community for local residents. Centers serve as a basis for organizing and focusing the development landscape and provide a framework for the most efficient provision of supportive infrastructure systems, including water, sewer, and transportation. By concentrating 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. *Connections 2040* identifies a hierarchy of seven Center types, shown on the Planning Areas and Centers map, based on their role and activities within the region.

METROPOLITAN CENTER

Center City/University City/Camden Central Business District – spanning the Delaware River and bounded roughly by

40th Street from Girard to Washington avenues in Philadelphia and by the Ben Franklin Bridge and Interstate 676 to Clinton Street in Camden – is identified as the region’s Metropolitan Center. This dense, compact, mixed-use area includes the central business districts of Philadelphia and Camden, major academic and medical institutions, and major tourist and entertainment destinations.

METROPOLITAN SUBCENTERS

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

NEIGHBORHOOD CENTERS

Connections 2040 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.

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, and residential activities. Neighborhood Centers have an identifiable main street or focal point, are walkable, and have a unique history or sense of a community within the larger city setting.

In addition to the metropolitan center, metropolitan subcenters, and neighborhood centers, the Plan identifies four other types of Centers: Suburban Centers, Town Centers, Rural Centers, and Planned Centers. The characteristics of each type are as follows:

SUBURBAN CENTERS

- ▶ Are regionally significant;
- ▶ While not necessarily single municipalities, are perceived as single “places;”
- ▶ Are suburban in character;
- ▶ Are less dense than town centers;

- ▶ Lack the integrated mix of uses found in town centers;
- ▶ Are defined primarily by a concentration and variety of office, retail, professional, and light industrial uses, and generally have more jobs than residents; 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;
- ▶ 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 CENTERS

- ▶ Are planned town-center-type developments on greenfields in Growing Suburbs or Rural Areas or through redevelopment on greyfields and/or brownfields in Developed Communities; and
- ▶ Have plans that call for village-type development, incorporating mixed, integrated land uses, relatively high densities, and pedestrian connections.

STRATEGIES 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.
- ▶ Emphasize redevelopment of abandoned or underutilized brownfield and greyfield sites into mixed-use areas.
- ▶ Support and reinforce social and educational programs in the region's Centers.
- ▶ Revitalize neighborhoods through local economic development activities, housing rehabilitation, and maintenance programs, and activities to improve the pedestrian environment, (including streetscape and lighting improvements).

**FIGURE 24:
PLANNING AREAS & CENTERS**

-  Metropolitan Center
-  Metropolitan Subcenter
-  Suburban Center
-  Town Center
-  Rural Center
-  Planned Center
-  Core City
-  Developed Community
-  Growing Suburb
-  Rural Area
-  Pinelands Management Area

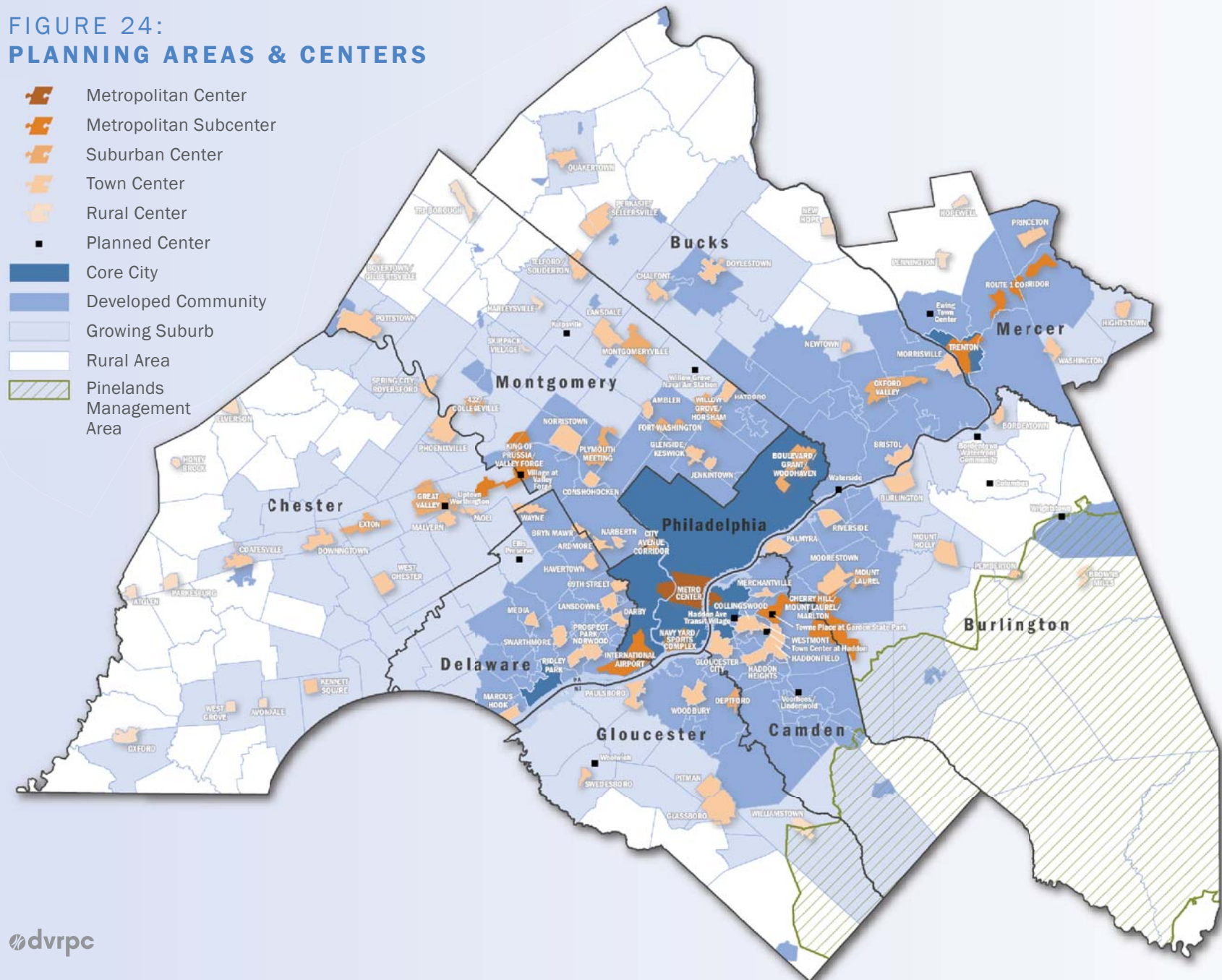







FIGURE 25: CORE CITIES & NEIGHBORHOOD CENTERS

-  Metropolitan Center
-  Metropolitan Subcenter
-  Suburban Center
-  Neighborhood Center
-  Core City

Maps not drawn to scale.

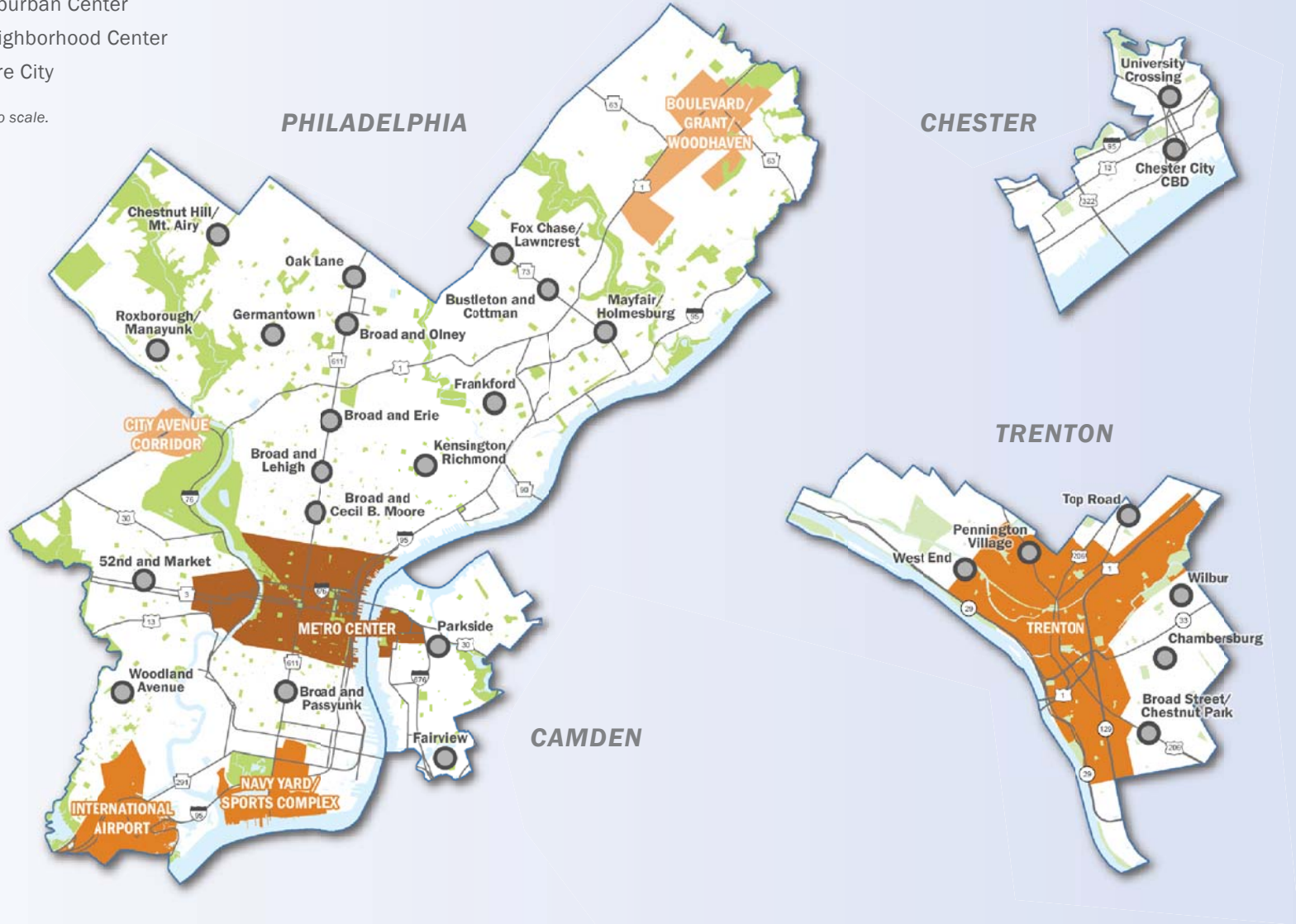


TABLE 4: PENNSYLVANIA CENTERS

| COUNTY | METROPOLITAN SUBCENTERS | SUBURBAN CENTERS | TOWN CENTERS | RURAL CENTERS | PLANNED CENTERS | NEIGHBORHOOD CENTERS |
|---------------------|--|--|---|--|---|--|
| BUCKS | _____ | Oxford Valley | Bristol Borough, Chalfont Borough, Doylestown Borough, Morrisville, Newtown Borough, Perkasie/Sellersville, Quakertown, Telford/Souderton | New Hope Borough | Waterside | _____ |
| CHESTER | King of Prussia/ Valley Forge | Exton, Great Valley | Coatesville, Downingtown Borough, Kennett Square, Malvern, Paoli, Phoenixville, Spring City/Royersford, West Chester | Atglen, Avondale, Elverson, Honeybrook Borough, Oxford Borough, Parkesburg, West Grove | Uptown Worthington | _____ |
| DELAWARE | International Airport | _____ | Darby Borough, Havertown, Lansdowne Borough, Marcus Hook, Media, Prospect Park/ Norwood, Ridley Park, Wayne, Swarthmore, 69th Street | _____ | Ellis Preserve | Chester City: Chester Central Business District, University Crossing |
| MONTGOMERY | King of Prussia/ Valley Forge | City Avenue Corridor, 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, Boyertown/ Gilbertsville, Harleysville, Skippack Village | Kulpsville, Village at Valley Forge, Willow Grove Naval Air Station | _____ |
| PHILADELPHIA | Navy Yard/ Sports Complex, International Airport | City Avenue Corridor, Boulevard/Grant/ Woodhaven | _____ | _____ | _____ | Broad & Passyunk, Woodland Avenue, 52nd & Market, Broad & Cecil B. Moore, Broad & Lehigh, Broad & Erie, Kensington/Richmond, Roxborough/Manayunk, Germantown, Chestnut Hill/Mt. Airy, Broad & Olney, Oak Lane, Frankford, Bustleton & Cottman, Fox Chase/Lawncrest, Mayfair/Holmesburg |

SOURCE: DVRPC

TABLE 5: NEW JERSEY CENTERS

| COUNTY | METROPOLITAN SUBCENTERS | SUBURBAN CENTERS | TOWN CENTERS | RURAL CENTERS | PLANNED CENTERS | NEIGHBORHOOD CENTERS |
|-------------------|--|------------------|--|---|--|---|
| BURLINGTON | Cherry Hill/ Mount Laurel/ Marlton | Mount Laurel | Bordentown, Burlington City, Mount Holly, Palmyra, Pemberton Borough, Riverside, Village of Moorestown | Browns Mills | Columbus, Wrightstown, Bordentown Waterfront Community | _____ |
| CAMDEN | Cherry Hill/ Mount Laurel/ Marlton | _____ | Collingswood, Gloucester City, Haddonfield, Haddon Heights, Merchantville, Westmont | _____ | Voorhees/Lindenwold, The Town Center at Haddon, Haddon Avenue Transit Village, Towne Place at Garden State Park | Camden City: Fairview, Parkside |
| GLOUCESTER | _____ | Deptford | Glassboro, Paulsboro, Pitman, Swedesboro, Woodbury | Williamstown | Woolwich Town Center | _____ |
| MERCER | Trenton, Route 1 Corridor | _____ | Hightstown, Princeton, Washington Town Center | Pennington Borough, Hopewell Borough | Ewing Town Center | Trenton: Broad Street/ Chestnut Park, Chambersburg, Wilbur, Top Road, Pennington Village, West End |

SOURCE: DVRPC



SUSTAINABILITY

TRANSFER OF DEVELOPMENT RIGHTS ORDINANCE APPLICATION IN FORT WASHINGTON OFFICE PARK

The Fort Washington Office Park opened in the 1950s, purposely located at the Pennsylvania Turnpike and PA 309 interchange to provide easy access, but also sited in flood-prone lowlands. Over time the office park grew, along with other development in the watershed. Now, the office park suffers from severe flooding, threatening people’s safety and causing significant property damage.

To deal with these ongoing challenges and maintain the strong economic base that the business park provides, Upper Dublin Township sought a solution that would resolve the flooding issue and also modernize the 1950s-era office park setting. A Transfer of Development Rights (TDR) ordinance provided the solution.

TDR ordinances are traditionally applied in Growing Suburbs and Rural Areas to use the development process to preserve agricultural or natural resource areas in one part of a municipality in exchange for increasing density in other locations better supported by land conditions and infrastructure. In the Fort Washington Office Park, the TDR ordinance is crafted to provide incentives to property owners to demolish their buildings in the flood prone areas and to clear and stabilize the land, in exchange for selling their development credits. Development credits may be purchased and used by developers for increasing density and building types, including residential and retail uses, on the higher-ground areas of the business park. Design regulations are also incorporated to create a more sustainable, inviting, and pedestrian-oriented pattern with both civic spaces and greenways.

PROMOTE AFFORDABLE AND ACCESSIBLE HOUSING



The availability of affordable and accessible housing is critical, both for enhancing the livability of individual

neighborhoods and maintaining the economic competitiveness of the region as a whole. A lack of affordable housing opportunities within a reasonable commute

of the workplace affects workers’ quality of life and can have significant consequences on employers, including difficulty in attracting and maintaining a qualified workforce; increased retraining costs; a need to pay disproportionately high wages; and 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.

First-time homebuyers, in particular, may find it difficult to locate an affordable home in the neighborhoods where they grew up, near their current workplace, or close to public transit. 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,

making it even more difficult to accumulate the necessary capital for a down payment and closing costs.

With the region's baby-boomers reaching retirement age over the next 20 years, accessible units woven into the fabric of

existing and planned centers, with easy access to the public transportation system, services, shops, restaurants, and other activities, will be needed. *Connections 2040* envisions thriving, vibrant communities, where families can afford to live close to work, the disabled can find

accessible units, and seniors can remain in the communities where they raised their children, while maintaining the greatest possible independence.



EQUITY

THE WHITMAN PARK REDEVELOPMENT IN CAMDEN CITY

In 2004, the City of Camden adopted a Redevelopment Plan for Whitman Park, a neighborhood that was then dominated by a vacant office building and large brownfield site. Despite its problems, the neighborhood had significant redevelopment potential, being located directly across from the PATCO High-Speed Line's Ferry Avenue Station and just a few blocks from Our Lady of Lourdes Hospital, one of the city's major employers. While the city's plan was being prepared, Conifer Realty LLC coincidentally acquired and rehabilitated the Tamarack Apartments, a poorly maintained housing project located adjacent to the redevelopment area. Although not technically part of the Whitman Park Redevelopment Plan, the renovated Tamarack Apartments became a catalyst for neighborhood revitalization. In 2005, Conifer converted the vacant office building into 86 affordable apartments for senior citizens, utilizing federal Low-Income Housing Tax Credits and state housing funds. The developer next remediated the area's large contaminated site and, in partnership with the Parkside Business and Community in Partnership (PBCIP), a neighborhood-based nonprofit organization, developed Conifer Village at Ferry Station, a 50-unit rental development for senior citizens. In early 2012, the partnership broke ground on Ferry Landing, a 48-unit townhouse development for families.

These projects were developed under the Green Futures Program of the New Jersey Housing and Mortgage Finance Agency, and the City of Camden contributed both funding and payment-in-lieu-of-taxes agreements. The PBCIP provided local input and worked to ensure that more than 30 percent of the construction contracts went to local firms and over 40 percent of the construction jobs to community residents, and the development team also implemented a program to train Camden residents in construction management. The infrastructure necessary to support 15,000 to 30,000 square feet of commercial/retail activity on an adjacent vacant lot was recently installed; and Whitman Park, the neighborhood park after which the area was named and once a magnet for crime and vagrancy, has been renovated and is now heavily used by neighborhood residents. In 2013, the transit-oriented infill redevelopment of the Whitman Park neighborhood in Camden City was awarded a New Jersey Future Smart Growth Award.

STRATEGIES TO PROMOTE AFFORDABLE AND ACCESSIBLE HOUSING

- ▶ Preserve the region's existing affordable housing stock by supporting programs that encourage rehabilitation or modification of existing units.
- ▶ Support local efforts to increase the stock of affordable, accessible housing units close to jobs and services and served by public transit, including local zoning revisions that allow a mix of residential housing types, adaptive reuse, and increased densities; streamlining plan review and permitting processes; and public-private partnership efforts.
- ▶ 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.
- ▶ Create accessible, pedestrian-friendly neighborhoods where families with children, seniors, and the disabled can safely walk, bike, and take public transit to jobs and services.

ENHANCE COMMUNITY DESIGN



Well-designed communities add value to the region. They can spur economic development, raise the quality of life, increase residential and retail market values, improve local safety, and positively affect the region's image. Well-designed communities

are places where people want to live and work, due to their combination of amenities and character. Greater Philadelphia has many examples of good community design in the identified Centers throughout the region. The region should ensure that redevelopment and new growth is deliberately designed on a human scale, according to smart growth principles.

FORM-BASED CODES



Form-based codes aim to improve the public realm by setting standards for the built environment rather than merely regulating land uses. Mount Holly, the county seat of Burlington County, New Jersey, recently prepared a form-based code, that is awaiting adoption, to facilitate public and private investment in its core downtown area. The primary motivation for changing the zoning code was that the existing zoning did not reflect the community's vision, nor did it reflect many of the desirable characteristics that are currently on the ground.

For instance, the majority of properties on Garden and Pine streets are built to the public right of way, with little to no private frontage space. The community prefers this frontage type, yet the current zoning code requires minimum setbacks and breaks with the existing character. Recently, these regulations resulted in new homes being built along Pine Street with large front setbacks and residential parking along the street edge, creating cavities along the street frontage and disrupting the neighborhood character. Protecting the community character to ensure that future development adds value is the primary goal of the new form-based code.



SOURCE: DVRPC

A core tenet of community design is to understand how people use the public realm, such as streets, sidewalks, parks, trails, and bridges, and how the private realm impacts the public realm. Does a building turn a blank wall to the street, or does it have an inviting facade with awnings and interesting shop windows? How wide is the sidewalk, and are there pedestrian-scale lighting, benches, and street trees? Are public spaces well maintained? Are blocks overly long and fronted by surface parking, making it less likely that people will want to walk? Does the design of a road make for inhospitable walking, crossing, and biking conditions? Does the design of housing allow privacy and community at the same time? A variety of decisions impact the public realm in ways we may not even realize.

Key principles of community design include: valuing the pedestrian experience; mixing residential and commercial uses; locating and orienting buildings toward transit stations; preserving and/or adaptively reusing historic buildings; infilling vacant land with context-sensitive development; placing parking on street, behind buildings, in alleyways, or in structures with liner buildings; creating wayfinding and signage systems; locating public facilities, such as schools and municipal offices, in areas that are accessible by a variety of modes and integrates them into the fabric of the existing community; and investing in facades, green infrastructure, and streetscaping. Local regulations should provide a predictable development

environment that allows for preservation of unique community characteristics and facilitates appropriate growth and change.

DVRPC's marketing program, Classic Towns of Greater Philadelphia, recognizes and promotes a number of the region's well-designed livable communities. A DVRPC online mapping application, the Smart Growth Project Database, tracks a variety of noteworthy development projects throughout the region, including development near transit, traditional neighborhood development, and conservation subdivisions.

STRATEGIES TO ENHANCE COMMUNITY DESIGN

- ▶ Adopt zoning ordinances that focus on form or building type (form-based codes) over use-based codes. Municipalities should adopt separate design guidelines if not using a form-based code.
- ▶ Encourage or require transit-oriented design, live/work space, accessory dwelling units, street trees, parking maximums, and universal design standards in zoning and subdivision/land development ordinances.
- ▶ Invest in streetscapes and green infrastructure.
- ▶ Develop parking standards based on parking supply and demand by pricing or metering strategies, and on innovative ways to calculate parking requirements and reduce parking requirements, particularly in areas with good transit service. Incentivize shared parking, and better design and manage existing parking resources. Use context and design treatments to best match off-street, structured, or bicycle parking to different land uses.

- ▶ Promote the use of historic tax credits and historic district designations, where appropriate.
- ▶ For new residential projects in the Growing Suburbs and Rural Areas, encourage traditional neighborhood development or conservation subdivision design.
- ▶ Update municipal sign ordinances regularly to keep pace with the fast-changing commercial sign industry and to better balance the need for economic growth with concerns over community aesthetics and traffic safety.

PROMOTE GREEN INFRASTRUCTURE



Street trees, rain gardens, bioswales, green roofs, urban woodlots, riparian buffers, and other types of naturally vegetated systems are all types of green infrastructure (GI). *Connections 2040* promotes using GI throughout the region's developed communities. GI performs valuable functions, like improving air quality, absorbing stormwater, and mitigating flooding. Green infrastructure

can also replace some types of gray infrastructure, such as underground stormwater pipes. And unlike gray infrastructure, green infrastructure boosts property values and promotes livability.

Many studies have quantified the value of GI: recent studies from the University of Pennsylvania show that planting a tree within 50 feet of a house can increase its value by nine percent, and cleaning and greening vacant lots can increase adjacent property values by as much as 30 percent. 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. One hundred mature tree crowns intercept approximately 100,000 gallons of rainfall per year. Translated into dollars, a single street tree produces \$90,000 of direct benefits, such as stormwater retention and air quality improvements, over its lifetime.

Despite all these benefits, loss of tree coverage is occurring 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 built-up areas:

- ▶ 50 percent tree 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, requiring trees in redevelopment and new development projects, and maintaining existing trees. Tree protection ordinances, tree inventories, and street tree commissions can help communities achieve their goals.

Converting existing streets into “green streets” provides a host of benefits in the public realm. Green streets include features such as swales, pervious pavement, medians with infiltration beds, street trees, and planted curb bump-outs. Since roadways are a large source of stormwater runoff and nonpoint source pollution, green streets can mitigate these problems at their source. Added vegetation also makes streets more attractive for pedestrians, encouraging more active street life, which further increases safety.

Many schools, particularly in urban areas of the region, are surrounded by concrete and asphalt. Greening these areas with trees and vegetation can reduce the heat island effect, filter air and water pollution, reduce stormwater runoff, improve recreational opportunities, and create more positive environments for students.

Community gardens represent an important type of GI in urban settings. Community gardens enhance biodiversity, provide greater access to fresher, healthier foods, increase food security for food-insecure populations, promote participation in neighborhood revitalization, and enhance community cohesion.

STRATEGIES TO PROMOTE

GREEN INFRASTRUCTURE

- ▶ Promote the planting and stewardship of shade trees in suburban and urban areas.
- ▶ Incorporate green street elements when new streets are constructed and when existing streets are upgraded.
- ▶ Encourage school districts to undertake schoolyard greening initiatives by working with nonprofits, civic associations, parent-teacher associations, and municipal officials.
- ▶ 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, and assisting in the formation of farmers’ markets.
- ▶ Integrate green infrastructure, such as shade trees, rain gardens, riparian buffers, and green roofs, into development and redevelopment projects.

INVEST IN PARKS AND RECREATION



Parks and recreational facilities benefit public health, social life, property value, water quality, wildlife habitat, and overall quality of life for many communities. There is a growing body of research on the benefits of parks for people and neighborhoods.

In many developed communities, parks provide the only connection to the natural world, which satisfies the psychological, emotional, and spiritual needs of humans. Parks can be important places for forming and maintaining social ties because people can meet new people at parks or socialize with those they already know. Urban green space helps lower public health care costs by providing benefits, such as injury recovery, improved pregnancy outcomes, lowered obesity rates, and reduction in stress and depression.

A direct economic benefit to parks and recreation can be found in the increased property value of homes located near quality parks. Studies have shown that homeowners are willing to pay a premium to live in close proximity to protected open space. This results in increased wealth for citizens when selling their homes, and increased tax revenue to government based on higher assessments, or property transfer taxes.



INNOVATION

PHILADELPHIA WATER DEPARTMENT'S GREEN CITY, CLEAN WATERS PLAN

Green City, Clean Waters is Philadelphia's 25-year plan to protect and enhance its watersheds by managing stormwater with innovative green infrastructure. The Philadelphia Water Department (PWD) developed Green City, Clean Waters to provide a clear pathway to a sustainable future, while complying with the U.S. Environmental Protection Agency's (EPA) requirements for urban wet weather pollution control. Nationwide, water utilities are trying to meet customer expectations for a safe and affordable water supply; the collection and treatment of wastewater and stormwater; flood protection; and clean, attractive, fishable, swimmable rivers and streams. There are also new challenges posed by aging infrastructure and the impacts of climate change. Meeting these challenges requires either a significant new investment in "gray" infrastructure (underground storage tanks and pipes) or the use of green infrastructure (street trees, rain gardens, bioswales, stormwater wetlands, green roofs, etc.) to capture, filter, and gradually infiltrate stormwater. As the city agency charged with ensuring compliance with the Federal Clean Water Act, PWD developed Green City, Clean Waters to achieve these goals by using green infrastructure systems that assist or mimic natural processes.

Philadelphia's Green City, Clean Waters program is pioneering a broad multidecade investment in green storm water management practices that reduces sewer overflows to the city's waterways and enhances communities and the overall urban environment. The Green Cities Clean Water Plan has been recognized by the EPA as a leader in green approaches to control urban stormwater.

HEALTH IN ALL POLICIES



A healthy population can signify a thriving economy and a flourishing environment. Health in All Policies is a concept that recognizes that the built environment – where one lives, works, plays, or travels – has an impact on an individual’s long-term health conditions, such as obesity, high blood pressure, and mental health. Health in All Policies is a framework that encourages the integration of health in policy assessment, decision-making, and public investments, and may bridge the large gaps between policy-making, implementation, and potential human health outcomes. Health in All Policies challenges every public agency and institution at all scales of government to consider health outcomes when making decisions. The concept is being promoted by many public health and planning professionals; and several planning agencies, including the Philadelphia City Planning Commission, are integrating health into different projects and processes. DVRPC is exploring Health in All Policies by working both internally and with state, county, and municipal partners to integrate health into various projects, including *Connections 2040*.

Landscaped parks provide environmental services like improved air and water quality, and provide habitat for wildlife, especially in urban environments. The trees, plants, and open space in parks provide natural stormwater management, reducing the amount of polluted runoff entering waterways and mitigating flooding. Trees in parks also mitigate air pollution, provide needed shade, lower air temperature, and absorb greenhouse gases.

STRATEGIES TO INVEST IN PARKS AND RECREATION

- ▶ Improve accessibility to parks by mitigating physical barriers, such as busy roads, and improving landscape aesthetics and lighting.
- ▶ Provide a mix of programming at popular parks to attract a larger number and more diverse group of users.
- ▶ Make capital investments in parks based on a long-term strategic vision, effective ongoing maintenance, significant community involvement, and local partners and advocates.

- ▶ Develop more parks in underserved areas, as urban greening and access to active and passive recreation can improve mental health, as well as encourage more active lifestyles.

PRINCIPLE: BUILD THE ECONOMY



Greater Philadelphia's regional economy is large and complex, with an annual gross metropolitan product of over \$380 billion (*Bureau of Economic Analysis, 2011*).

This coverage area includes the nine-DVRPC counties, plus Salem County, New Jersey, New Castle County, Delaware, and Cecil County, Maryland. The region's economy ranks among the most diverse of the nation's major metro areas. The diverse economy, although not booming, is resilient, protecting the region from the potential extremes in growth or decline that economies dependent on one or two major industries often experience. *Connections 2040* reiterates the goals and strategies embodied in *The Greater Philadelphia Economic Development Framework*, accepted by the United States Economic Development Administration as the regional comprehensive economic development strategy (CEDS). The regional CEDS was created and is maintained under the direction of a committee of state, county, city, and regional economic development and planning professionals. Through the regional CEDS process, DVRPC is actively engaged in regional efforts to support and grow the economy.

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DVRPC's Economic Development Planning Philosophy

- ▶ **The *Connections 2040* Plan reiterates the goals and strategies embodied in *The Greater Philadelphia Economic Development Framework*, the adopted regional comprehensive economic development strategy (CEDS).**
- ▶ ***Connections 2040* supports the Commonwealth of Pennsylvania's Keystone Principles for Growth, Investment, and Resource Conservation, and is consistent with the economic strategies advanced in New Jersey's State Strategic Plan.**
- ▶ **Continued coordination across state, city, and county lines, across sectoral interests, and across the public and private sectors is essential to maintaining a broad regional perspective and finding a common vision and goals.**
- ▶ **Invest in Centers, to facilitate the most efficient use of infrastructure; conserve open space and natural resources; provide employers with easy access to supplies, markets, and a qualified workforce; and create concentrations of "knowledge density."**
- ▶ **Support the growth of key economic sectors and locations within the region.**



Greater Philadelphia has tremendous potential for continued economic growth. The region is home to concentrations of such cutting-edge sectors as biotechnology, health services, higher education, and the creative industries. There is also a burgeoning alternative and clean energy industry, a sector poised for high growth during the coming years. Greater Philadelphia has established itself as a center for businesses and professionals, who possess the skills necessary to transform challenges in energy efficiency and ecological sustainability into a competitive economic advantage, creating jobs and quality economic development for our region. An important driver of continued economic growth is the region's ability to

transfer innovative discoveries from its many academic and research institutions to industry partners, and to commercialize new technologies.

The Greater Philadelphia 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. Continued coordination across state, city, and county lines, across sectoral interests, and across the public and private sectors is essential to maintaining a broad view of the region and finding a common vision, goals, and policies.

Building the Economy will provide the following benefits:



- ▶ **A steady supply of jobs in emerging, high-growth industries.**
- ▶ **Business growth in development Centers well served by infrastructure and utilities.**
- ▶ **An enhanced climate for entrepreneurship, innovation, and new business formation.**
- ▶ **A high-quality, productive workforce, supported through improved educational attainment outcomes.**
- ▶ **The creation of jobs that match the skills of the region's workforce, including jobs that provide employment opportunities as a ladder out of poverty for those most in need.**
- ▶ **Expanded regional connections to the global economy.**
- ▶ **Reduced energy consumption, resulting in a lower cost of business for area companies.**

DEVELOP A MORE ENERGY-EFFICIENT ECONOMY



High, rising, and volatile energy prices have a tremendous impact on our economy. Total expenditure in the

region for energy (electricity, natural gas, gasoline, diesel, heating oil, and jet fuel) in 2010 is estimated at about six percent of the region's economy. While future energy prices cannot be predicted, most observers agree that they will increase over the long term. As energy prices increase, more of our regional economy is eaten up by energy—essentially all of which is imported into the region—leaving fewer resources available to address other regional needs.

High quality of life does not require high energy use: delivering services with less energy has benefits beyond the cost savings. Less driving means shorter trips and less time in traffic. Green Buildings, with better insulation and more efficient heating and cooling systems, mean greater comfort. Ninety percent of GHG emissions in the Greater Philadelphia region are associated with the combustion of fossil fuel to produce energy, including that

burned to generate electricity. Thus, an energy-efficient economy is essential to the region's goal of reducing GHG emissions.

Municipal, regional, and state-level policies to encourage energy efficiency and conservation in buildings will further reduce our region's energy requirements. Municipalities can lead by example by adopting these practices within their own operations. The lessons learned and dollars saved will serve as an example to the broader community. 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.

A profound transformation of the global economy is expected over the coming decades. Regions that deliver energy efficiency and low GHG emissions will have a competitive advantage. This shift presents a tremendous opportunity for Greater Philadelphia. As we 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 the regional cooperation and strong coordination between the states, counties, and municipalities that DVRPC continues to play a critical role in building and leading.

STRATEGIES TO DEVELOP A MORE ENERGY-EFFICIENT ECONOMY

- ▶ Provide services with less energy by encouraging the use of more efficient vehicles, buildings, and equipment, and expanding transit services.
- ▶ Local governments can continue to provide the lead in increasing energy efficiency by reducing energy use in their daily operations.
- ▶ Educate and prepare the region for emerging energy-efficient technologies.



PHOTO: EDWARD SAVARIA JR. FOR PECO



SUSTAINABILITY

CIRCUIT RIDER FOR ENERGY EFFICIENCY IN LOCAL GOVERNMENT OPERATIONS

Faced with tight budgets and limited staffing, many municipalities are unable to effectively sift through competing options for energy-efficiency improvements. To address this issue, DVRPC recently launched the Regional Circuit Rider for Energy Efficiency in Local Government Operations (“Circuit Rider”). The Circuit Rider serves as a shared energy management resource for smaller municipalities in southeastern Pennsylvania, helping identify and implement cost-effective strategies to reduce energy use in municipal buildings, outdoor lighting, and water/sewage treatment facilities. The Circuit Rider provides municipal governments with a forum to learn about and share energy management best practices, and serves as a one-stop-shop for municipalities to access resources and funding to implement cost-effective energy management projects in their municipal operations. The Circuit Rider has worked directly with municipal governments in southeastern Pennsylvania, to provide free technical consulting services to measure, analyze, and develop implementation strategies for cost effective energy-management practices. More than 50 municipalities have attended quarterly Circuit Rider seminars on energy management topics.

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, accounting for almost 60 percent of the region’s jobs. As manufacturing employment has declined, 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 as principal drivers of the economy. Other key sectors include alternative energy and energy conservation; the creative industries; tourism; specialty manufacturing; and food production and distribution.

With limited available funding for infrastructure improvements, facilities that serve clusters of key economic sectors should receive priority attention. In order to compete both nationally

and internationally, the region must continue to attract new companies and encourage the expansion of existing companies in key economic sectors that have both the greatest potential for growth and pay higher wages.

STRATEGIES TO SUPPORT AND PROMOTE THE GROWTH OF KEY ECONOMIC SECTORS

- ▶ Identify key sectors and work with academic institutions, business incubators, venture capitalists, and others to expand existing companies and attract or develop new companies.
- ▶ Prioritize transportation and other infrastructure investments that serve key economic sectors.



ENHANCE THE CLIMATE FOR BUSINESS GROWTH AND IMPROVE EFFICIENCIES IN GOVERNMENT

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The Philadelphia region is politically fragmented, with 352 local governments, nine county governments, six regional councils of government, two state governments, and hundreds of school and municipal authorities. To effectively compete in today's economy, the region's decision-makers and policy-makers must work cooperatively to make the region attractive to current and prospective employers. Although home rule undeniably enhances the ability of local governments to effectively

respond to their constituents' unique needs, fragmentation also poses a greater risk for institutional overlap and parochialism. Multilevel governmental regulations and review processes that unreasonably extend the time it takes to reach a decision on a proposed development, or that impose an unfair tax burden on prospective employers, can dissuade businesses from locating or expanding in the region.

More efficient, effective, and collaborative local government is a regional priority. The region's 352 municipalities, and hundreds of school and local authorities, all provide services to their constituents. Often these services are duplicative or could be coordinated or consolidated to save money and improve service delivery, while still honoring local autonomy. For that reason, local governments should analyze the fiscal impacts, efficiencies, and other consequences of sharing or consolidating local services.

STRATEGIES TO ENHANCE THE CLIMATE FOR BUSINESS GROWTH AND IMPROVE EFFICIENCIES IN GOVERNMENT

- ▶ Increase the speed, predictability, and transparency of government decision-making.

- ▶ Continue to promote and secure a more attractive business tax environment.
- ▶ Foster regional collaboration and engage local business leaders in growing the regional economy.
- ▶ Encourage local governments to share services, particularly if one's municipality is not already sharing these commonly shared, capital-intensive services: courts, health insurance, parks and recreation, road maintenance, fire, police services, public works, solid waste, library, human resources, property management, legal services, finance, and information technology. Shared services should be based on a specific feasibility study, and municipalities should create their own performance data before entering into an agreement with another municipality.
- ▶ Encourage local governments to provide a higher level of service delivery rather than focusing solely on cost savings, since cost savings may not be achieved in all cases.

FOSTER A HIGH-QUALITY, PRODUCTIVE WORKFORCE AND IMPROVE EDUCATIONAL ATTAINMENT



The availability of a skilled, productive workforce is critical if the region expects to continue to compete effectively in today's economy. Improving the region's public education system, especially in the urban districts, is a critical task. Data from Select Greater Philadelphia shows that the region is home to over 90 educational institutions that offer at least a two-year Associate's degree, and ranks third nationally (behind only New York and Boston) in the number of four-

year colleges and universities. There is a tremendous opportunity to leverage the region's impressive higher-education resources to raise the level of educational attainment, especially in the region's Core Cities and urbanized areas. Colleges and universities should be actively involved with local elementary and secondary schools to increase the performance and motivation of students.

Opportunities to help develop skills through industry and school partnerships, and specialized training that offers pathways into specific careers, such as bio-technicians or energy auditors, also exist. Additionally, small employers must be better connected with the resources available through workforce training programs.

STRATEGIES TO FOSTER A HIGH-QUALITY, PRODUCTIVE WORKFORCE AND IMPROVE EDUCATIONAL ATTAINMENT

- ▶ Improve the region's pre-K-to-12 public education, especially in the urban districts.
- ▶ Leverage the region's impressive higher-education resources to raise the level of educational attainment.
- ▶ Support industry-school partnerships and specialized training that offer pathways into specific careers.
- ▶ Improve the connections between small employers and the resources available through the public workforce system and others involved in workforce training.



EQUITY

GRADUATE!PHILADELPHIA

Greater Philadelphia trails most of our peer regions in educational attainment, particularly in our Core Cities and Developed Communities. Graduate!Philadelphia was founded in 2005 as a response to research that showed that 50 percent of Philadelphians who began taking college courses dropped out before completing their degree. The program is a partnership of local colleges and universities designed to provide support, advice, and guidance to adults with some college experience (but no degree) who are seeking to complete their degree and gain the credentials necessary to secure a good job. To date, Graduate!Philadelphia has helped over 2,500 adults attain their college degree, enabling them to improve their skills and enhance the region's workforce, while also setting an example for the next generation.

INCREASE INNOVATION AND NEW BUSINESS FORMATION



Given the region's impressive academic resources, an important driver of continued economic growth is the ability to transfer innovative discoveries and intellectual knowledge from universities to industry partners, and to commercialize new technologies to stimulate economic growth. Greater Philadelphia has a rich history of innovative thinking and bringing promising new technologies to market. Since 2000, research and development (R&D) expenditures by academic and research institutions in the region have consistently amounted to almost three

percent of the nation's overall R&D expenditures. A 2011 study by Select Greater Philadelphia noted that the region ranked fifth among the nation's top metros in terms of R&D activity, with over \$10.5 billion in R&D spending in 2008.

Many of the region's universities have affiliations with technology and science incubators, allowing businesses access to a vast pool of university talent and equipment. The availability of venture capital is also critical; in 2012, venture capitalists supplied approximately \$399 million to companies throughout the region, although it was the first time in five years that the amount failed to top \$400 million (mirroring a similar decline seen throughout the nation).

STRATEGIES TO INCREASE INNOVATION AND NEW BUSINESS FORMATION

- ▶ Accelerate technology transfer from research institutions to stimulate new company formation related to research results.
- ▶ Expand the availability of venture and other investment capital.
- ▶ Foster and enhance the region's culture of entrepreneurship by generating collaborations among investigators/inventors, venture capitalists, academics, and experienced start-up business executives.



STARTUP PHL

StartUp PHL is a collaboration between the City of Philadelphia Department of Commerce and the Philadelphia Industrial Development Corporation intended to strengthen the entrepreneurial environment in Philadelphia, by backing smart proposals that will energize the startup scene and increasing the availability of seed-stage capital by creating a public/private venture fund dedicated to making investments in Philadelphia-based startups. Startup PHL provides grants to projects that enhance collaboration in the startup community; support the city's existing entrepreneurial community, as well as attract new entrepreneurs from both within and outside the city; foster networks for entrepreneurs to collaborate with each other, mentors, talent, and investors; and ultimately lead to more business and job creation in Philadelphia.



Parking A-West



Baggage Claim 4,5,6



Terminal A-West

EXPAND THE REGION'S CONNECTIONS TO THE GLOBAL ECONOMY



Expanding the Greater Philadelphia region's connections to the global economy is essential to effectively competing

in an interconnected world. In today's economy, the region is competing not only with other nearby major metro areas, but also with global markets, such as China, the European Union, Japan, Mexico, and Canada. International trade must be promoted, and foreign direct investment must be attracted.

Competing successfully on an international level requires expanded capacity and connections at Philadelphia International Airport, as well as enhanced utilization of the region's ports and overall leverage of the region's multimodal infrastructure.

Global challenges present local opportunities to redirect regional economic development efforts and to prepare the region to compete in a future where energy-efficient and environmentally benign products and services will be key drivers of growth.

Additionally, Philadelphia must position itself as a world class city and region — an international destination for businesses, talent, visitors, and immigrants.

Philadelphia's strengths include its historic architecture, walkability, affordability, museums and cultural attractions, restaurants, and universities. Achieving the status of 'world class' will require continued investment in regional arts, cultural, and historical institutions; maintaining effective and reliable infrastructure systems; promoting international tourism; improving environmental quality; and promoting entrepreneurship and innovation.

STRATEGIES TO EXPAND OUR CONNECTIONS TO THE GLOBAL ECONOMY

- ▶ Promote international trade.
- ▶ Continue to attract foreign direct investment.
- ▶ Expand capacity and improve international connections, particularly to Asian markets, at Philadelphia International Airport (PHL).
- ▶ Enhance utilization of the region's ports and overall leverage of the region's multimodal infrastructure.
- ▶ Enhance the region's desirability by investing in arts, cultural, and recreational amenities; supporting entrepreneurs and innovative thinkers; improving environmental quality; maintaining affordable housing opportunities; and investing in public infrastructure.
- ▶ Support ongoing efforts to make Philadelphia a world-class city and region.

PRINCIPLE:

ESTABLISH A MODERN MULTIMODAL TRANSPORTATION SYSTEM



Connections 2040 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.

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 tremendous 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, port, and intercity rail facilities, which serve as our links to the rest of the nation and world.

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DVRPC's Transportation Planning Philosophy

- ▶ **The transportation planning process will be comprehensive, cooperative, continuing, compatible, and coordinated. The first three are the basis of the federally required "3C" process.**
- ▶ **Transportation investments will support the goals and policies of the DVRPC long-range plan. Investment benefits and costs should be strategically distributed across the region, with careful consideration of environmental, economic, and social impacts. Projects should be affordable and incorporate context-sensitive design and other smart transportation techniques.**
- ▶ **The transportation investment priorities are:**
 - 1) **Preserve and maintain the existing transportation system and rights of way;**
 - 2) **Improve the operation of existing transportation facilities; and**
 - 3) **Increase the capacity of the existing multimodal transportation system, limiting the addition of through travel lanes.**

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 70 years, many suburban areas do not have enough density to support transit, and portions of the urban system are underutilized. The Plan tries to address these issues by promoting development patterns that are more conducive to increased transit service.

Biking 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. They are also increasing in popularity as a healthy alternative to driving, and these forms of transportation are ideal for a centers-based development pattern.

STATE OF THE SYSTEM



The region’s road and transit systems are aging,

and both require extensive investment to bring them up to a state of good repair, and even more to maintain them into the future. Funding for bridges presents a particularly significant dilemma. 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, putting us at a competitive disadvantage. It is important to note that the strategies in the Plan will help achieve the vision for the future, but will require sufficient funding to implement.

Establishing a modern multimodal transportation system will provide the following benefits:



- ▶ 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 and cultural resources that would be lost by the construction of new roads.
- ▶ 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.



SOURCE: DVRPC

ENSURE TRANSPORTATION INVESTMENTS SUPPORT LONG-RANGE PLAN GOALS



Transportation projects should support the four core plan principles of managing growth and protecting the

environment; creating livable communities; building the economy; and 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 growth and reinvestment in the region's Centers, have limited

environmental impact, and support key economic sectors. Potential projects are evaluated to make sure that they help achieve the key principles outlined in the Plan.

STRATEGIES TO ENSURE TRANSPORTATION INVESTMENTS SUPPORT LONG-RANGE PLAN GOALS

- ▶ Encourage investment in the region's Centers and older, developed areas.
- ▶ Apply context-sensitive design standards to transportation facilities.
- ▶ Promote transit-oriented development and mixed-use development.
- ▶ 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 Long-Range Plan and Transportation Improvement Program based on sound long-range strategic planning considerations, life-cycle investment analyses, and system performance and condition data.

REBUILD AND MAINTAIN THE REGION'S TRANSPORTATION INFRASTRUCTURE



Our transportation system is both extensive and old. Pennsylvania has the highest number of structurally deficient state-maintained bridges in the nation, and 31 percent of the region's state-maintained lane miles of pavement are in poor condition. SEPTA has rail bridges

that are a century old, substations and signals from the 1930s, and trains from the 1970s. The rebuilding of the existing network of roads, transit lines, and other transportation facilities is the focus for transportation investments moving forward at the national, state, and regional level. 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 trails in the interim is one way in which key corridors can be preserved for future use.

STRATEGIES 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.

ENSURE ADEQUATE FUNDING



The region faces many challenges in fully funding the current and future needs of the transportation system. The federal and state gas taxes that we pay at the pump is the primary source of revenue for transportation projects. Improving fuel economy has many benefits, such as improving air quality. However, higher fuel efficiency means that less money is being collected at the pump, which means that we have less funding to modernize our transportation system. Long-term prospects are not good, as Congress has had to transfer \$53 billion of General Fund revenue into the Highway Trust Fund since 2008, as gas tax revenues have declined.

Transportation operators are working hard to tailor projects to the size or scope of the problem, respect the character of the community, take into account alternative modes, and plan 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.

CREATE A SAFER TRANSPORTATION SYSTEM



The region's *Transportation 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 key emphasis areas, which focus on various safety issues, including: aggressive driving, impaired driving, roadway

departure crashes, and seatbelt use. The *Transportation Safety Action Plan* is a data-driven living document that is coordinated with New Jersey's and Pennsylvania's statewide safety plans.

Pedestrian fatality rates are higher than the national average in both New Jersey and Pennsylvania, and in the DVRPC region. Both states are current FHWA Pedestrian Safety Focus States, and Philadelphia is a Focus City. Ensuring pedestrian safety is one of seven key emphasis areas identified in the *Transportation Safety Action Plan*.

STRATEGIES TO CREATE A SAFER TRANSPORTATION SYSTEM

- ▶ Consider safety in all projects and seek funding for specific improvements to transportation infrastructure to increase safety.
- ▶ Address the safety needs of environmental justice population segments, including elderly or disabled people.
- ▶ Maintain a regional crash database and conduct studies and projects to identify high crash locations and develop safety enhancements.



EQUITY

COMPLETE STREETS

Both PennDOT and NJ DOT are committed to developing complete streets throughout the region. Complete streets accommodate all modes and diverse groups of users, allowing each person to have safe access to any form of transportation. Complete streets uses universal design practices to ensure that the physically disabled can safely travel on wider sidewalks, ramps, and curb cuts.

Complete streets increases road safety through traffic calming, and by encouraging alternative modes. Pedestrians and bicyclists benefit from safety in numbers, and reducing the need to drive everywhere lessens the risk of being involved in a crash.

Driving is our most expensive mode of transportation. By improving access to more affordable alternative modes, transportation is less expensive for everyone. Alternative modes also use considerably less energy and emit fewer greenhouse gases. By reducing the long-term impacts of climate change, not only do we benefit, but so do our children and future generations.



SOURCE: DVRPC

- ▶ Support appropriate enforcement to improve safety, including building knowledge for applicable legislative initiatives, supporting relevant professional development for law enforcement staff, and educating members of the judicial branch of the consequences of frequently reducing charges.
- ▶ Utilize techniques such as traffic calming, roundabouts, and road diets to enhance safety, where appropriate traffic conditions exist.
- ▶ Promote and coordinate programs that educate about and market safety.

CREATE A MORE SECURE TRANSPORTATION SYSTEM



There has been an increased national focus on security since the events of September 11, 2001, which established a larger role for MPOs in this area. One goal of this effort is to explore ways that MPOs can play a part in security planning. DVRPC researches and communicates appropriate security efforts of our partners. DVRPC fulfills its classic role of facilitating the exchange of ideas and resource sharing to build upon existing programs to further security efforts in the region.

STRATEGIES TO CREATE A MORE SECURE TRANSPORTATION SYSTEM

- ▶ Elevate security in the planning process and 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.
- ▶ Coordinate and cooperate with other bodies involved in regional transportation security planning, response efforts, and recovery efforts.

INCREASE ACCESSIBILITY AND MOBILITY



Accessibility refers to the ability to reach desired destinations within the region, and mobility refers to the movement of people and goods. 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.

This is a growing concern due to the increase in demand for local transit in suburban areas for low income, older persons, and persons with disabilities. There is a critical geographic 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 to the automobile is crucial so that everyone in the region can enjoy mobility.

STRATEGIES TO INCREASE ACCESSIBILITY AND MOBILITY

- ▶ Provide access to key employment, commercial, institutional, and tourism centers in the region.
- ▶ Provide system accessibility for all segments of the population and increase affordable transportation alternatives.
- ▶ Comply with regulations and guidelines for the Americans with Disabilities Act and Title VI.

THE CONGESTION MANAGEMENT PROCESS



The Congestion Management Process (CMP) is a federal planning requirement that advances the goals of the long-range plan and strengthens the connection between the Plan and the Transportation Improvement Program. A guiding principle of the CMP is that transportation investments will support the land use goals and policies of the Plan. It identifies and prioritizes congested corridors and multimodal strategies to mitigate the congestion. Where additions to capacity are found to be appropriate, the CMP includes supplemental strategies to get the most long-term value from the project.

Regulations require projects that add single-occupancy-vehicle capacity to be consistent with the CMP in order to be eligible for federal funding. The CMP defines procedures for all federally funded major capacity-adding road projects, whether in congested corridors or not. 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.

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 2012, the Greater Philadelphia region experienced 156 million hours of travel delay, which ranks seventh nationally. This equates to over 75 million gallons of excess fuel consumed and an annual cost of more than \$3.4 billion due to sitting in congestion. Reducing congestion has traditionally been accomplished by expanding network capacity. However, repeated experience has shown that new capacity quickly fills up and entices expanded development ever further out. Other strategies, such as making the transportation system more efficient, reducing demand by instituting transportation demand management strategies, and providing alternatives to the single-occupant vehicle can also accomplish the same goal.

STRATEGIES TO REDUCE CONGESTION

- ▶ Optimize the efficiency of the existing transportation system through incident management, access control, signal system improvements, roundabouts, and needed highway improvements.
- ▶ Focus construction of new capacity on missing links and priority bottlenecks.
- ▶ Support and enhance programs to reduce the number of vehicle trips and the amount of vehicle miles traveled, particularly single-occupant vehicle trips, and encourage practices that spread travel throughout the day and throughout the week.
- ▶ Provide more options for commuters by improving bicycle and pedestrian facilities, and increasing transit coverage area and service hours, including increasing the number of multimodal transportation centers and park-and-ride facilities.
- ▶ Consider roadway pricing options as a mechanism for reducing congestion.

HELPING TO REDUCE CONGESTION

The region's trains, subways, trolleys, and buses help to reduce the number of vehicles on our roads. Similarly, the incident management programs, interconnected traffic signals, and other operational and Intelligent Transportation System (ITS) infrastructure in the region improves traffic flow and helps to reduce the amount of time we sit in traffic, which saves all of us time and money.



PUBLIC TRANSPORTATION

REDUCES
ANNUAL HOURS
OF DELAY BY



AND PROVIDES
ANNUAL
CONGESTION
COST SAVINGS OF



OPERATIONAL INFRASTRUCTURE

REDUCES
ANNUAL HOURS
OF DELAY BY



AND PROVIDES
ANNUAL
CONGESTION
COST SAVINGS OF



GRAPHIC SOURCE: DVRPC
DATA SOURCE: TEXAS TRANSPORTATION INSTITUTE. 2012
URBAN MOBILITY REPORT. AUSTIN, TEXAS. 2013.

LIMIT TRANSPORTATION IMPACTS ON THE NATURAL ENVIRONMENT



Transportation has a significant impact on the natural environment. Automobiles, in particular, contribute significantly to air and noise pollution and greenhouse gas emissions, while oils, grease, heavy metals and other toxins in stormwater run-off from roads pollute surface waters.

STRATEGIES TO LIMIT TRANSPORTATION IMPACTS ON THE NATURAL ENVIRONMENT

- ▶ Encourage the reduction in use of travel modes that contribute significantly to air pollution by increasing the use of public transit, bicycle and pedestrian facilities, telecommuting, and ridesharing.
- ▶ Encourage the use of more fuel-efficient or alternative fuel vehicles to reduce greenhouse gas emissions.
- ▶ Incorporate green stormwater infrastructure into road construction, rehabilitation, and retrofits to capture and infiltrate stormwater.
- ▶ Work with federal and state resource agencies to identify, avoid and minimize impacts to sensitive environmental resources throughout project planning, design and construction.
- ▶ Where impacts are unavoidable, assist in the identification of compensatory mitigation measures.



SUSTAINABILITY

SEPTA CLIMATE CHANGE ADAPTATION PROJECT

DVRPC is teaming with SEPTA and ICF International to pilot test an approach for assessing the vulnerability of SEPTA's regional rail system to projected changes in climate. This project is one of seven climate change adaptation pilots awarded by the Federal Transit Administration (FTA). This innovative project combines the climate change adaptation expertise of ICF International, the transit system planning and operation expertise of SEPTA, and the stakeholder facilitation, climate change adaptation, and environmental planning expertise of DVRPC. The assessment is building directly on the actual experiences of historical weather-related service disruptions to SEPTA's regional rail system as a proxy for the types of events that might be expected under future climate conditions. This allows climate change adaptation planning to build on and be informed by the actual costs of these disruptions, the current protocols for addressing weather-related disruptions, and the on-the-ground personnel who operate and maintain the system. The results of this project will inform efforts of both the FTA and SEPTA to evaluate and understand the impacts of climate change on transit agency operations and assets, and will help them better provide transit agencies with guidance on assessing vulnerability and increasing resilience to the impacts of climate change.



INNOVATION

LINKING PLANNING AND NEPA

DVRPC is committed to avoiding, minimizing and compensating for the negative impacts of transportation projects and is supporting a new approach that will better link environmental planning, 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 provides a process for implementing these goals within federal agencies. Its most significant impact is to require the preparation of Environmental Assessments (EAs) and/or Environmental Impact Statements (EISs) for all federalized projects. EAs and EISs contain statements of the environmental effects of proposed federal agency actions. As with NEPA, the metropolitan planning process also considers the environmental impacts of proposed projects. Identifying transportation solutions that avoid or minimize environmental impacts early in the planning process can produce better projects and simplify NEPA down the road.

During planning, DVRPC considers the impacts of transportation projects on the region's regulated and unregulated environmental resources. Conducting this screening and analysis gives planners the ability to prioritize projects that avoid and minimize environmental impacts. Where impacts are unavoidable, compensatory mitigation measures can also be identified during the planning process. The result is projects that better align with environmental goals and a streamlined NEPA process.



PHOTO: SEPTA

ELECTRIC AND NATURAL GAS VEHICLES



As part of its program to reduce energy use and GHG emissions in the transportation sector, DVRPC has just completed *Ready to Roll: Southeastern Pennsylvania's Regional Electric Vehicle Action Plan*, which lays out recommendations to prepare

the region for electric vehicles. DVRPC is also leading the Pennsylvania Partnership to Promote Natural Gas Vehicles. This project is working in partnership with the Pennsylvania Department of Environmental Protection, PECO Energy, the Philadelphia Gas Works, and Greater Philadelphia Clean Cities to promote cost-effective use of natural-gas-fueled trash trucks and school buses in the five counties of southeastern Pennsylvania.

IMPROVE 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. 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 inter- and intra-agency coordination.

Benefits of transportation operations programs have been widely documented. For example, deploying emergency service patrols on expressways in New Jersey yields a benefit-to-cost ratio of over 33:1, and results in reductions in incident duration, fewer secondary accidents, and saves millions of gallons of fuel. Improving traffic signal timings by installing adaptive traffic signal control technologies reduces travel times and delays by 10 to 50 percent,

translating into a noticeable reduction in emissions of pollutants. Using Automatic Vehicle Location (AVL) systems on buses has improved on-time bus performance by 12 to 23 percent, thereby reducing passenger wait time 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 accurate real-time information; the ability to share information among agencies and with the public; and having the appropriate resources available to respond to situations.

POLICIES AND STRATEGIES TO IMPROVE TRANSPORTATION OPERATIONS

- ▶ Reduce traffic congestion through improved incident management. Incident management strategies include:
 - ▶ *Improve incident detection and verification.*
 - ▶ *Improve response times.*
 - ▶ *Improve interagency coordination and cooperation.*
 - ▶ *Improve incident clearance.*

- ▶ Reduce traffic congestion through improved traffic management. Traffic management strategies include:
 - ▶ *Implement integrated corridor management.*
 - ▶ *Optimize traffic signal operations.*
 - ▶ *Improve work zone management.*
 - ▶ *Implement traffic control programs.*
 - ▶ *Improve winter weather management.*

- ▶ Provide more options for travelers by delivering real-time information. Traveler information strategies include:
 - ▶ *Collect travel condition information.*
 - ▶ *Promote public-private partnerships to disseminate traveler information.*

- ▶ *Enhance agency traveler information programs.*
 - ▶ *Enhance enroute traveler information.*
-
- ▶ Improve delivery of transit services. Transit management strategies include:
 - ▶ *Implement technologies to control and operate transit systems.*
 - ▶ *Upgrade transit information systems.*
 - ▶ *Improve fare collection.*
 - ▶ *Improve security and passenger safety.*

FOSTER A MULTIMODAL TRANSPORTATION SYSTEM



It is imperative that the region’s transportation system is both comprehensive in the modes that it comprises and seamless in the connections between the various modes. Trips frequently begin on one mode, such as a bike or car, but utilize other modes, such as transit or walking, to complete. Availability of seamless connections between modes is a critical component to promote transit, biking, and walking and achieving a more sustainable future.

Beginning with the creation of the Interstate Highway System in the 1950s, the national vision for transportation was to build more and more roads. With the Interstate Highway System essentially complete, the emphasis now and in the future has shifted to improving the performance of our existing roads. Greater Philadelphia is a mature region, with established settlement patterns and stable population and employment. There is not a critical need to expand the system as in some areas of the country, which have experienced significant population and employment gains. 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 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 roadway 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.

While the predominant form of transportation in the region is currently the car, there are other modes, such as transit, biking, and walking, that many people rely on and others would choose if it was more convenient. These other modes are more sustainable and appropriate in a centers-based planning paradigm.

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.

Bicycling and walking are fast-growing, low-impact, environmentally friendly, healthy, 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.



PHOTO: J. FUSCO FOR GPTMC

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, and the provision of educational programs for cyclists, pedestrians, and drivers.

The Circuit Coalition is a collaboration of nonprofit organizations, foundations, and agencies working to advance completion of a connected network of trails — The Circuit — in the Greater Philadelphia region. Today, The Circuit is over 250 miles of walking and biking trails in the Greater Philadelphia region. When complete, The Circuit will encompass 750 miles of trails, and the region will have a trail network unlike any other in the country — connecting the urban, suburban, and rural communities

of the fifth largest metropolitan region in the country. The Circuit will make our region stronger by providing a place for healthy transportation and recreation, connecting our communities to green space, and making our neighborhoods more attractive places to live and work.

STRATEGIES TO FOSTER A MULTIMODAL TRANSPORTATION SYSTEM

- ▶ Conduct analysis and planning on a corridor-wide, rather than a facility level, to expand the scope of potential solutions and consider all modes and choose the most efficient way to move people and goods on a case-by-case basis.
- ▶ Develop complete streets to accommodate all modes and users.
- ▶ Establish opportunities for connections among all modes and improve scheduling and operations to accommodate intermodal movements.

FIGURE 26:
THE CIRCUIT
 REGIONAL MULTIUSE TRAILS NETWORK

Circuit Trails

- Existing
- In Progress
- Planned
- East Coast Greenway
- Greenspace Network



FIGURE 27:
FREIGHT CENTERS

-  **Mega Center**
1,500 Acres or More
-  **Major Center**
700 - 1,499 Acres
-  **Intermediate Center**
250 - 699 Acres

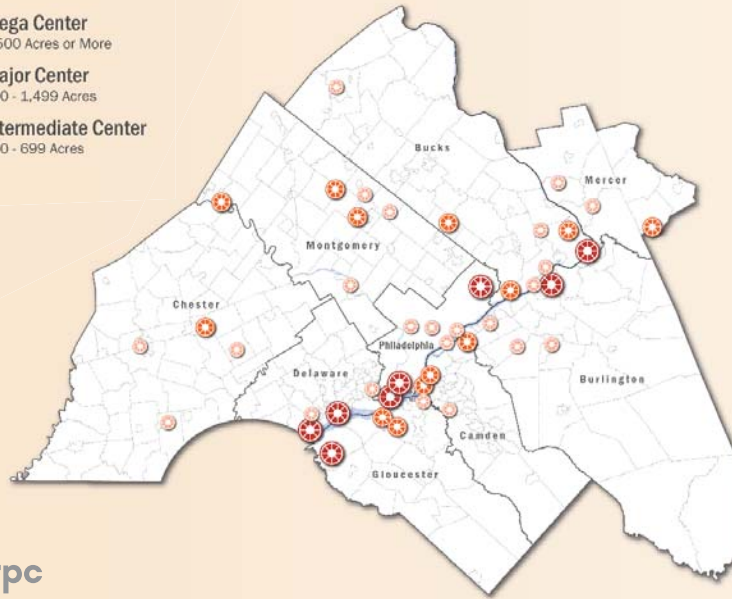


PHOTO: PHILADELPHIA REGIONAL PORT AUTHORITY (PRPA)

Freight and aviation system projects receive little or no direct funding from the long-range plan or Transportation Improvement Program. However, both rely on the existing transportation network and are critical to achieving the goals of the Plan, and each has specific perspectives, policies, and challenges.

FREIGHT

Freight shipments—as indicated by the abundant number of trucks, trains, ships, and airplanes that move seamlessly through the region each day—provide compelling evidence of the Greater Philadelphia region’s vigorous economic activity and open trade with other regions, states, and countries. Now accentuated by federal transportation legislation, freight transportation planning requires a full understanding of the unique needs of

shippers and carriers and the demands placed on transportation infrastructure due to the transport of freight.

The movement of goods is enabled by an extraordinary multimodal freight network. Among the primary attributes of the network are:

- ▶ 500 miles of freeways and 30 miles of National Highway System connectors heavily used by tractor trailers;

- ▶ 700 miles of interstate, secondary, and short line rail freight lines utilized by three Class I rail carriers and a dozen short line railroads; and
- ▶ 31 port terminals on the Delaware and Schuylkill rivers, and three commercial airports, which attract marine and freight services from all over the world.

In its totality, the freight network serves local businesses and residents and is used as a gateway to reach the 100 million people who live within 500 miles of the region.

Much local freight transportation activity can be directly traced to 44 highly diverse freight centers spread among the region’s nine counties and local municipalities. These freight centers and their elements (such as industrial parks, intermodal terminals, and distribution centers) are a testament to the broad range of manufacturing, warehousing, transportation, quarry, and utility activity that occurs locally. They also highlight the strong linkage between freight transportation and land use and between freight transportation and job creation.

Planning for freight transportation presents unique challenges not associated with planning for passenger transportation.

For example, freight transportation data is more disparate and proprietary in nature, rendering efforts to perform accurate long-term freight flow forecasts very difficult. Also, logistics practices are subject to radical change. Recent innovations such as containerization, just-in-time deliveries, and e-commerce have revolutionized and altered global shipping patterns.

Another prominent factor, major external freight transportation and industrial projects, can have significant consequences, but also offer enormous opportunity for the region. For example, the Marcellus Shale natural gas and Bakken crude oil ventures have already produced profound local economic impacts. Idled refineries are being repurposed to process liquid products from the Marcellus reserves and pipelines are being constructed to transport propane and ethane for processing and shipping from the port. The expansion of the Panama Canal will also present additional opportunities for the region as East and Gulf Coast ports are poised to take advantage of additional traffic headed this way. The Delaware River main channel is being deepened to 45 feet and port expansion is underway with new facilities at Paulsboro and Southport. Goods movement policies include promoting

freight as a good neighbor strategies and creating private-public partnerships to fund necessary projects. In the immediate future, recently acquired TranSearch freight data will be used to paint a more thorough picture of local commodity flows, with a special eye toward trends in changing energy production and consumption.

AVIATION

Aviation is a critical link in connecting the Greater Philadelphia region with the nation and world. The region’s aviation system encompasses commercial, reliever, and general aviation airports, as well as heliports, in the traditional nine-county DVRPC jurisdiction, as well as Salem County, New Jersey, New Castle County, Delaware, and Cecil County, Maryland. Having an accessible and efficient aviation system helps foster a high quality of life for residents, businesses, and visitors alike, allowing access to people and markets worldwide.

Philadelphia International Airport (PHL) regularly ranks among the top 12 busiest airports worldwide by aircraft movements (takeoffs or landings). PHL has a \$14.4 billion economic impact on the region and provides 141,000 jobs with more than 200 employers. PHL’s hub status means flights are abundant for

**FIGURE 28:
GREATER PHILADELPHIA
REGIONAL AIRPORT SYSTEM**

-  Commercial Airport
-  Reliever Airport
-  General Aviation Airport
-  Military Airport
-  Heliport



both business and leisure travelers, as well as cargo needs. As commercial aviation continues to consolidate (as with the proposed merger between US Airways, the primary carrier at PHL, and American Airlines), it is economically vital for the region that PHL be maintained and expanded as a hub operation; for instance, by adding direct flights to emerging markets in Asia and Latin America. In addition to PHL, commercial service is once again available from both Trenton/Mercer and Wilmington airports, providing a choice of three commercial airports in the region for travelers and airlines. Future plans at PHL include a new runway and two

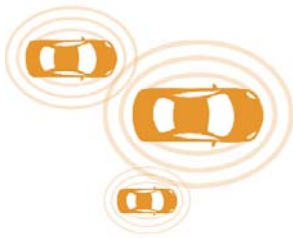
runway extensions, which will reduce congestion and allow more long-haul flights. New terminals, cargo facilities, and an automated people mover system are also envisioned. Growth at PHL not only creates jobs, but also contributes to the region's overall economic development by providing greater transportation and shipping services, which attract a diversity of industries.

In addition to the three commercial airports, the region's 10 reliever airports play a key role in the regional aviation system by providing access for business aircraft. These facilities allow for improved access to business centers

throughout the area, while freeing up capacity at commercial airports. Another 11 general aviation airports provide facilities for both business and recreational aircraft. The region is further complemented by five heliports, providing dedicated facilities for helicopter, or vertical flight (VF), needs, in addition to VF facilities at many airports.

With the scarcity of undeveloped land in Greater Philadelphia, airports are often affected by competing land uses. Commercial airports may seek to expand into neighboring areas, while, conversely, new residential or commercial developments may encroach on existing reliever and general aviation facilities. As the replacement cost and feasibility of building new airports is prohibitive and available open land in the region is nonexistent for future replacement airports, preservation of these facilities is important for future aviation success in stimulating regional economic activity and relieving congestion at commercial airports.

Aviation planning has many challenges, including congestion, competing land uses, and economic uncertainty. The decisions made now in regards to aviation planning will be felt for many decades to come, so it is paramount that the region work together to provide a comprehensive and effective plan.



LOOKING TO THE FUTURE: THE ROLE OF TECHNOLOGY IN TRANSPORTATION

Technology has long played a key role in transforming how people get around. In the future, it will help to lower costs, reduce emissions, improve safety, and make vehicles more efficient and reliable. Achieving future technological solutions will mean that innovations will need to be economically viable, overcome potential liability and regulatory issues, and gain acceptance by society at large.

There are numerous technologies that have the potential to drastically change how we get around. In the future, vehicles may be powered by electricity, liquefied natural gas, propane, biogas, compressed air, hydrogen fuel cells, or a hybrid approach. These advancements will help to achieve the average industry fleet wide 54.5 mpg that will be required by 2025. Nanotechnology can enhance battery life, provide lightweight and high-strength materials, and reduce the size and increase the computing power of remote sensors. These remote sensors have numerous road uses, from adaptive traffic signals to monitoring bridge and road conditions and repair needs. Telecommuting and e-commerce are technologies that have been around for a while, but their continued growth would greatly impact regional travel patterns.

Adaptive signal control technology (ASCT) uses remote sensors and computing power to respond to real time traffic. FHWA estimates that ASCT systems can increase traffic throughput by 10 to 50 percent, depending on the corridor and type of previous signal system. Less than one percent of the signals in the United States currently employ this technology.

Connected cars use wifi to communicate with other vehicles, and can warn drivers of upcoming traffic congestion, accidents, or other emergencies. Crash avoidance systems will use sensors imbedded along the roadway to prevent cars from veering off the road, or perform automatic braking if there is a chance for a collision. This vehicle-to-vehicle communication could become part of the technology used in driverless cars. Nearly all major car manufacturers, along with Google, are developing driverless vehicles. These vehicles use cameras, radar, and laser sensors to maneuver along the roadway. Estimates as to when driverless cars could take the road vary from between five and fifty years. As self-driving cars become more common, they will be able to travel closer together. This will both increase the capacity of the existing road network and allow for the use of drafting as a way to reduce energy consumption. Driverless cars could alter the vehicle ownership model, with a decrease in privately owned cars and an increase in shared vehicle ownership. This could revolutionize the carsharing model, and by removing the sunk costs of automobile ownership, other modes may benefit.

The pace at which technological innovations are coming to the market seems to be accelerating. New technologies that do not exist today are likely to emerge in the next few years and change the course of other developing technologies. Knowing exactly how and when change will occur is a much more difficult proposition. The impacts of these technologies on the use and performance of the transportation system are largely theoretical and could have very different outcomes than what has been predicted. Monitoring the impacts of upcoming technology is another reason for regular updates to the region's long-range plan.



PHOTO: J. FUSCO FOR GPTMC

05 | TRANSPORTATION INVESTMENTS

A key role of the Plan is to outline a vision and strategy for how the region will invest in transportation infrastructure over the next 27 years. This section lays out a vision for maintaining and improving the transportation system to achieve the future potential for Greater Philadelphia. Since we can't afford all identified needs, the financial plan prioritizes projects for funding by developing forecasts of reasonably anticipated revenue, allocating the revenue to project categories based on need and policy, and evaluating and selecting specific major regionally significant projects for funding in the Plan. This chapter also considers how to address the transportation funding gap.

THE VISION FOR THE FUTURE

The vision for the future is to achieve and maintain a state-of-good repair for all existing transportation infrastructure, further improve the operation of existing facilities, and, where appropriate, expand the system. In short, maintaining and modernizing our transportation system.

DVRPC worked with PennDOT, NJ DOT, SEPTA, NJ Transit, PATCO/DRPA, and other regional stakeholders to determine what investments need to be made over the life of *Connections 2040* to maintain and modernize the region's transportation system. At the heart of this exercise was an in-depth needs assessment utilizing asset management systems that collect detailed data and monitor the various components of the network. The needs assessment identified what is required to bring the roadway and transit systems to a state-of-good repair, and also what types of operational and system expansion projects are necessary for the region to continue to grow and prosper in the future.

The reality is that we can't afford all of the identified needs. Therefore, *Connections 2040* outlines a Vision Plan and then identifies a Funded Plan, of projects that can be achieved over the life of the Plan.

Identifying Future Needs

The needs assessment determined the projects that are necessary to achieve the goals outlined in *Connections 2040*. Roadway, bike and pedestrian, and transit investments are grouped into the following categories:



ROADWAY SYSTEM PRESERVATION



ROADWAY OPERATIONAL IMPROVEMENTS



BIKE AND PEDESTRIAN



ROADWAY SYSTEM EXPANSION



ROADWAY OTHER



TRANSIT SYSTEM PRESERVATION



TRANSIT OPERATIONAL IMPROVEMENTS



TRANSIT SYSTEM EXPANSION



TRANSIT OTHER



Roadway System Preservation

maintains existing roadway pavement and bridge infrastructure. Needs estimates for these categories were developed using the federally required Pavement Management System and Bridge Management System databases, which track the condition of each roadway lane mile and bridge. This estimate also includes what DVRPC forecasts as the needs for county and local roadways and bridges eligible for federal aid.



Roadway Operational Improvements

use physical changes or technology to improve the efficiency of the existing network. Physical improvements include intersection/interchange reconstruction, new turn lanes, and roadway realignment, to improve the functionality and safety of the roadway network. Technological improvements include the use of Intelligent Transportation Systems (ITS), incident management programs, or traffic signal upgrades. The region's *Transportation Operations Master Plan* is the basis for the needs assessment for this category. Transportation operations have unique funding and implementation requirements. ITS and incident management programs have capital funding components, but also have

substantial maintenance (e.g., hardware and software) and operations (e.g., personnel) costs associated with them.



Bike and Pedestrian needs are

reflected by the region's desire to be more bike and pedestrian friendly. On-road needs are based on current funding levels in the Pennsylvania and New Jersey Transportation Improvement Programs (TIPs), as well as additional targeted funding levels to increase the region's investment in such facilities. Off-road needs are based on constructing all unbuilt, multiuse trails in The Circuit Regional Trail Network.



Roadway System Expansion

projects add capacity to the roadway network by widening or extending existing facilities, or building new roads or interchanges. These projects have a significant impact on regional travel, and most projects in this category are listed in the Plan as major regional projects. Minor new capacity projects are widenings of generally less than a few lane-miles in length on minor arterial and collector roads. The need for major regional projects was based on the projects included in the *Connections 2035 Plan*, a review of recent transportation and corridor studies, and a call for projects from planning partners.

All roadway system expansion projects are required to be consistent with the region’s Congestion Management Process (CMP) and are evaluated to be consistent with land use, environmental, economic development, and transportation goals.



Roadway Other includes needs for miscellaneous items, such as parking facilities, drainage, environmental mitigation, Transportation Management Associations (TMAs), engineering, regional and local planning, and debt service. These needs are based on forecasting future need based on projects and costs that are included in the current TIP for Pennsylvania and New Jersey.



Transit System Preservation represents needs for existing rail infrastructure, vehicle fleets, and stations. Regular vehicle track, signal, catenary, power substations, signals, vehicle overhaul and replacement, station renovations, and ADA accessibility needs were used to develop the need for each of these three categories using asset management data.



Transit Operational Improvements reflects the need to improve the functionality of the existing system. Types of projects include real-time information systems, signal preemption, fare

TABLE 6: TOTAL TRANSPORTATION NEED (2014-2040)

(BILLIONS OF Y-O-E \$)

| MODE | PROJECT CATEGORY | PENNSYLVANIA | NEW JERSEY |
|-------------------------|---------------------------------|------------------|------------------|
| ROADWAY | System Preservation | | |
| | Pavement Preservation | \$ 12.6 B | \$ 6.1 B |
| | Bridge Preservation | \$ 33.9 B | \$ 6.2 B |
| | Operational Improvements | \$ 3.9 B | \$ 2.6 B |
| | Bicycle and Pedestrian | \$ 0.5 B | \$ 0.2 B |
| | System Expansion | \$ 1.5 B | \$ 1.0 B |
| | Other | \$ 0.4 B | \$ 0.4 B |
| ROADWAY SUBTOTAL | | \$ 52.9 B | \$ 16.4 B |
| TRANSIT | System Preservation | | |
| | Rail Infrastructure | \$ 11.4 B | \$ 0.9 B |
| | Vehicles | \$ 11.6 B | \$ 1.7 B |
| | Station Enhancements | \$ 5.2 B | \$ 0.1 B |
| | Operational Improvements | \$ 2.9 B | \$ 0.8 B |
| | System Expansion | \$ 5.7 B | \$ 3.9 B |
| | Other | \$ 2.0 B | \$ 0.9 B |
| TRANSIT SUBTOTAL | | \$ 38.8 B | \$ 8.4 B |
| SUBREGION TOTAL | | \$ 91.7 B | \$ 24.8 B |

SOURCE: DVRPC

modernization, and double tracking and sidings to improve service frequency. The estimated needs were developed by DVRPC and regional transit agencies.



Transit System Expansion identifies new transit facilities, routes, and lines that the region would like to pursue. Need for this category is based on a short list of projects developed by the Long-Range Plan Committee and includes projects listed

in the *Connections 2035 Plan* and DVRPC’s *Long-Range Vision for Transit* report.



Transit Other is a miscellaneous category that includes safety, security, coordinated human services, and debt service. Need for this category is estimated by remaining debt obligation payments and accounting for outlays over the life of the Plan based on current and future expenditures.

Regionally, the needs assessment identified more than \$116 billion in transportation improvements, predominantly to preserve and maintain our existing network. These needs represent the region's desired investments, or the Vision Plan.

The infrastructure in the Pennsylvania subregion is generally older and more expansive, and this is reflected in the total estimated need for the subregion. In Pennsylvania, there is an estimated \$53 billion in roadway projects, and almost \$39 billion for transit projects, over the next 27 years. Total roadway need for the New Jersey subregion is estimated to be just over \$16 billion, and total transit need for the New Jersey subregion over the life of the *Connections 2040* Plan is estimated to be more than \$8 billion. These figures are in year-of-expenditure (Y-O-E) dollars to account for the impact of inflation over the life of the Plan.

THE VISION PLAN

The Vision Plan includes all of the identified improvements that are needed to attain the region's transportation goals outlined in the

previous chapter. Since the Plan considers a 27-year planning horizon, there is a focus on Major Regional Projects. However, the needs assessment considers all sizes and types of projects that are critical to achieving our transportation goals.

Major Regional Projects are large-scale projects that will have a significant impact on regional travel. Almost all system expansion projects are Major Regional Projects, as are reconstruction projects on the region's freeways. Major Operational Improvement initiatives, such as SEPTA's fare modernization project, are also listed in the Plan. Smaller-scale projects were identified in the needs assessment, but for the sake of brevity, are not listed in the Plan document. The various funding categories in the Plan serve as placeholders for funding these smaller-scale projects, as they are included in future iterations of the Transportation Improvement Program.

FUNDING OUR FUTURE

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. Federal requirements also dictate that fiscal constraint be determined using Y-O-E dollars so that inflation is accounted for when determining project costs.

The Funded Plan represents the projects in the Vision Plan that are able to be afforded over the life of *Connections 2040*. Key decisions for the financial plan were considered by the Long-Range Plan Committee. All planning principles and financial assumptions in identifying federal and state financial resources and investment needs are developed with and reviewed by federal, state, and transit partners. Detailed documentation and technical analysis that went into developing the financial plan can be found in the

Connections 2040: Technical Analysis (DVRPC publication #13043).



TRANSPORTATION IMPROVEMENT PROGRAM

★ TIP TRANSPORTATION IMPROVEMENT PROGRAM

Inclusion in the *Connections 2040* Funded 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 and includes projects of all sizes and scope. The TIP is the regionally agreed-upon list of priority projects to be advanced during a three- to four-year timeframe. 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.

Where Will the Funding Come From?

DVRPC identified all federal, state, and local revenue sources that the region can reasonably expect to receive through the year 2040. Revenue estimates are for capital project expenditures. Preparation of this financial plan revenue estimate included a review of historical data and trends. The Plan anticipates \$52.5 billion Y-O-E dollars in total federal, state, and local funding over its 27-year lifespan.

FEDERAL FUNDING

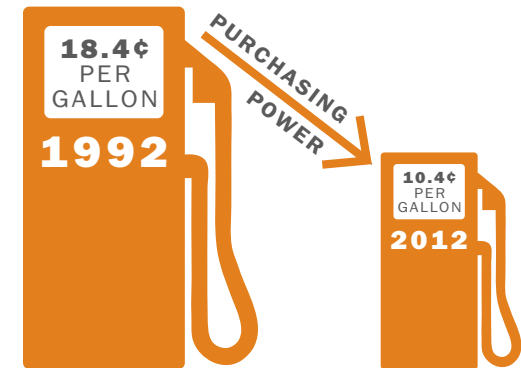
Approximately 65 percent of the region's transportation funding comes from federal sources, principally the Highway Trust Fund, which is primarily funded through gas tax

receipts. The federal gas tax of 18.4 cents per gallon has not been increased since 1993. Meanwhile, the Highway Trust Fund has required \$53 billion in general fund infusions since 2008 to avoid insolvency. Poor economic conditions, rising fuel prices, and more fuel-efficient vehicles have meant less gas tax revenue. Inflation since the last gas tax increase has eaten away more than 40 percent of its purchasing power. 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

The second largest source of funding for transportation projects are the states

THE IMPACT OF INFLATION ON THE FEDERAL GAS TAX



DATA SOURCE: PRODUCER PRICE INDEX; INPUTS TO CONSTRUCTION INDUSTRIES
GRAPHIC SOURCE: DVRPC

of Pennsylvania and New Jersey, which contribute approximately 15 percent and 18 percent, respectively. The region faces similar funding issues at the state level as it does at the federal. Pennsylvania's gas tax was last raised in 1997. New Jersey has the second-lowest gas tax in the nation, and it was last increased in 1988.

Financial guidance from PennDOT and NJ DOT assumes flat state and federal funding for at least the next 10 years. After that, from 2024 to 2040, DVRPC has assumed a growth rate of three percent per year compounded annually based on anticipated recovery from the economic recession and a return to historical revenue trends.

**TABLE 7: FUNDING BY SOURCE AND MODE
(2014-2040) (BILLIONS OF Y-O-E \$)**

| STATE | MODE | FEDERAL | STATE | LOCAL | TOTAL |
|---------------------------|-----------------|------------------|------------------|-----------------|------------------|
| PENNSYLVANIA | Highway | \$ 16.8 B | \$ 3.3 B | \$ 0.4 B | \$ 20.6 B |
| | Transit | \$ 7.4 B | \$ 4.7 B | \$ 0.5 B | \$ 12.6 B |
| | Subtotal | \$ 24.2 B | \$ 8.0 B | \$ 1.0 B | \$ 33.2 B |
| NEW JERSEY | Highway | \$ 7.5 B | \$ 5.0 B | \$ 0.0 B | \$ 12.6 B |
| | Transit | \$ 2.3 B | \$ 4.3 B | \$ 0.2 B | \$ 6.9 B |
| | Subtotal | \$ 9.8 B | \$ 9.3 B | \$ 0.2 B | \$ 19.4 B |
| DVRPC REGION TOTAL | | \$34.0 B | \$ 17.3 B | \$ 1.2 B | \$ 52.5 B |

SOURCE: DVRPC

FIGURE 29: REGIONAL FUNDING BY SOURCE

FEDERAL **65%** ■
STATE **33%** ■
LOCAL **2%** ■



SOURCE: DVRPC

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In 2013, several transportation funding strategies to provide additional transportation revenue were put forth by the Pennsylvania Senate, House, and Governor. Since none were enacted by the legislature at the time of Plan adoption, the Plan does not consider any additional future revenue from Pennsylvania in the Plan’s fiscally constrained revenue forecast. Should additional revenue be secured, the Plan will be amended at that time.

LOCAL FUNDING

Many regions around the country contribute a significant amount in local funding toward transportation projects. Local transportation funding is generally comprised of revenues derived locally, such as a dedicated sales tax or dedicated bonds. The Greater Philadelphia region provides very little transportation funding from local sources, compared to peer regions around the country. If federal funding decreases in the future, regions with a strong dedicated local source of transportation funding will be more competitive in maintaining their system and promoting economic growth.

However, neither Pennsylvania nor New Jersey grants authority to raise revenues at the regional or local level. This means that local matches for state-maintained facilities must come from the municipal or county general funds. Not only do transportation projects have to compete with many other competing needs in municipal budgets for funding, state-maintained facilities also have to compete with all the locally maintained roads and bridges that municipalities and counties manage. These local facilities are often in a worse state of repair than state roads and bridges.

FIGURE 30: REGIONAL TRANSPORTATION NEEDS COMPARED TO AVAILABLE FUNDING (BILLIONS OF Y-O-E'S)

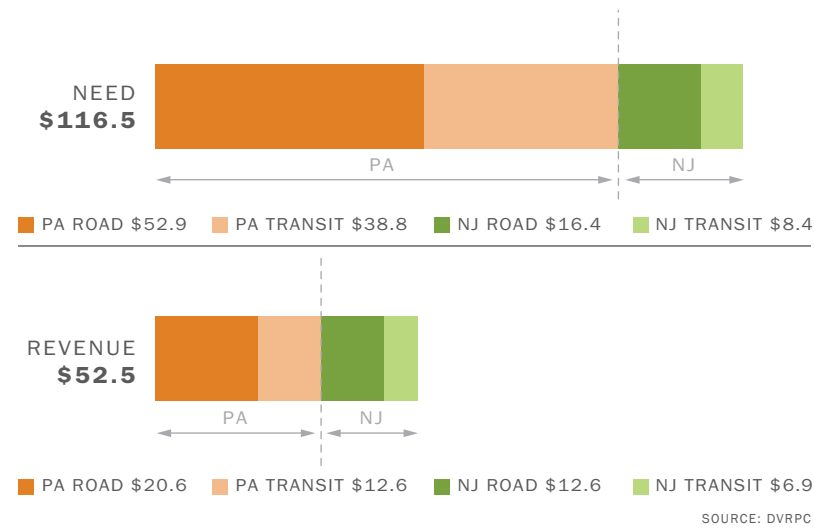
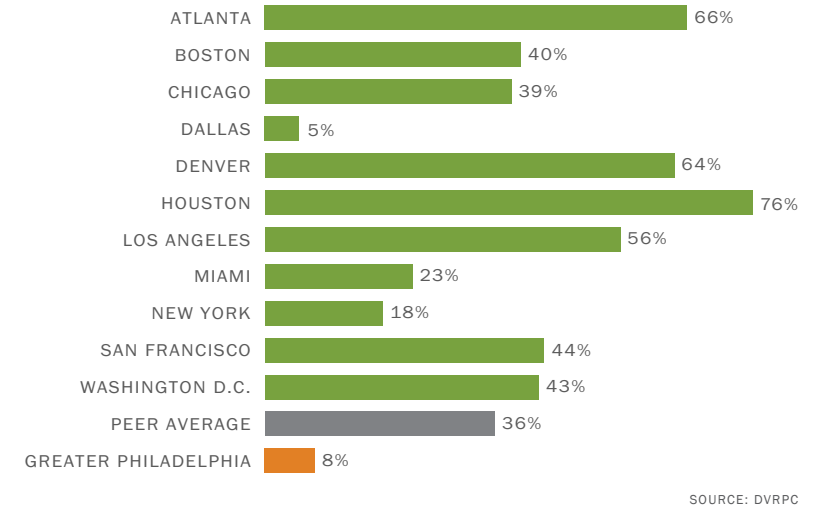


FIGURE 31: PERCENT OF TRANSIT CAPITAL FUNDING FROM LOCAL SOURCES



AUTHORITY AND OTHER FUNDING

There are several transportation authorities in the region, such as the Pennsylvania and New Jersey turnpike authorities and the Delaware River Port Authority, which generate their own revenues, generally via tolling. Revenue generated by these authorities is not included as a revenue source in the Plan, although major regional externally funded projects are listed in Table 16.

THE FUNDING GAP



In the Pennsylvania subregion, based on forecasted revenue figures, there is a total estimated funding gap of \$32.3 billion for roadway projects over the life of the Plan. Only about 39 percent of the total Plan vision is able to be funded. There is a total transit funding deficit of about \$26.2 billion over the life of the Plan. Only about 32 percent of the total identified transit vision is able to be funded.



In the New Jersey subregion, on the highway side, there is a total estimated funding deficit of \$3.9 billion over the life of the Plan. About 76 percent of the total vision can be funded. On the transit side, there is a total funding deficit of about \$1.5 billion over the life of the Plan.

The Funded Plan

The Funded Plan lists those Major Regional Projects in the Vision Plan that the region can reasonably anticipate completing by 2040. Project selection was based on the evaluation criteria and collaboration with the Long-Range Plan Committee. Major regional project costs are broken out over several funding categories, since their scope can involve road reconstruction, replacing or rehabilitating bridges,

operational or safety improvements, and system expansion components.

All critical major regional projects are shown in the following tables. These tables identify the facility, project scope, county location, and either completion date by funding period for fiscally constrained projects, or identification as unfunded if the project is not included in the fiscally constrained plan. Projects that show a

completion date are included in the fiscally constrained Funded Plan.

The Plan also sets aside funding for smaller-scale projects that will be identified in subsequent Transportation Improvement Programs. More detailed information for each of these projects, and a demonstration of fiscal constraint, is shown in the *Connections 2040 Technical Analysis*.

TABLE 8: FUNDING ALLOCATION TO PROJECT CATEGORIES

| MODE | PROJECT CATEGORY | PENNSYLVANIA | | NEW JERSEY | |
|---------------------------|---------------------------------|-------------------|-------------------|-------------------|-------------------|
| | | TARGET ALLOCATION | ALLOCATED REVENUE | TARGET ALLOCATION | ALLOCATED REVENUE |
| ROADWAY | System Preservation | | | | |
| | Pavement Preservation | 30% | \$ 6.2 B | 40% | \$ 5.0 B |
| | Bridge Preservation | 50% | \$ 10.3 B | 38.5% | \$ 4.8 B |
| | Operational Improvements | 11.5% | \$ 2.4 B | 12% | \$ 1.5 B |
| | System Expansion | 5% | \$ 1.0 B | 5% | \$ 0.6 B |
| | Bicycle and Pedestrian | 1.5% | \$ 0.3 B | 1.5% | \$ 0.2 B |
| | Other | 2% | \$ 0.4 B | 3% | \$ 0.4 B |
| ROADWAY SUBTOTAL | | 100% | \$ 20.6 B | 100% | \$ 12.6 B |
| TRANSIT | System Preservation | | | | |
| | Rail Infrastructure | 32% | \$ 4.0 B | 13% | \$ 0.9 B |
| | Vehicles | 33% | \$ 4.2 B | 23.5% | \$ 1.6 B |
| | Station Enhancements | 14.5% | \$ 1.8 B | 2% | \$ 0.1 B |
| | Operational Improvements | 5% | \$ 0.6 B | 8% | \$ 0.5 B |
| | System Expansion | - | \$ 0.0 B | 40% | \$ 2.7 B |
| | Other | 15.5% | \$ 2.0 B | 13.5% | \$ 0.9 B |
| TRANSIT SUBTOTAL | | 100% | \$ 12.6 B | 100% | \$ 6.8 B |
| DVRPC REGION TOTAL | | 100% | \$ 33.2 B | 100% | \$ 19.4 B |

SOURCE: DVRPC

FIGURE 32: PENNSYLVANIA SUBREGION SYSTEM PRESERVATION NEED VS. ALLOCATED REVENUE (2014-2040) (BILLIONS OF Y-O-E \$)

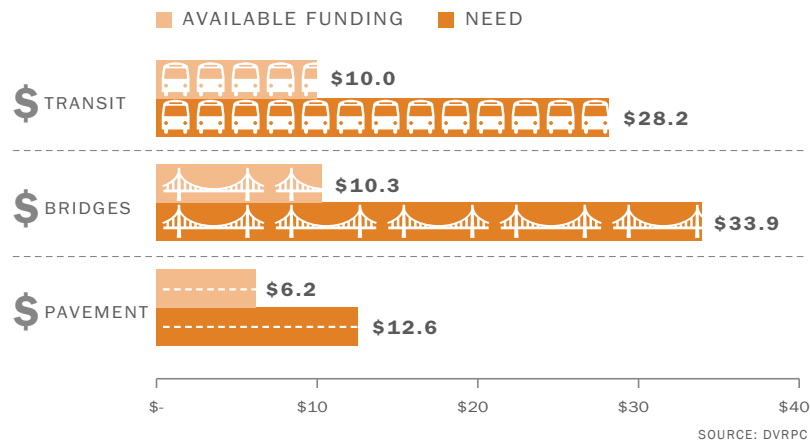
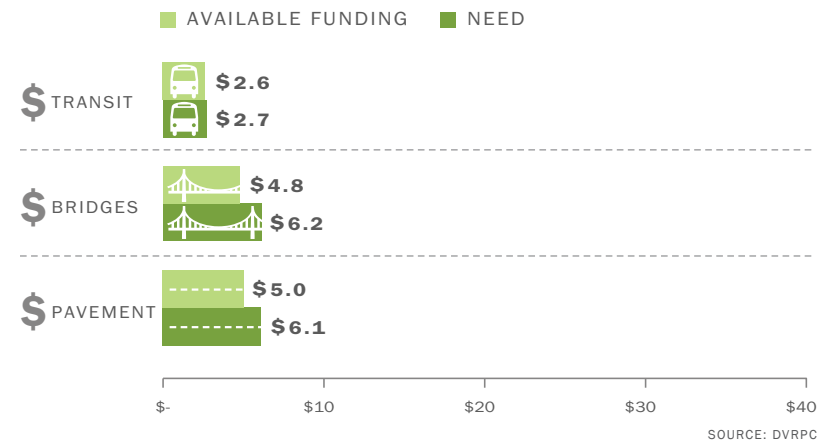


FIGURE 33: NEW JERSEY SUBREGION SYSTEM PRESERVATION NEED VS. ALLOCATED REVENUE (2014-2040) (BILLIONS OF Y-O-E \$)



Funding Distribution by Category

Funding is allocated to each of the highway and transit funding categories based on comparative need, as well as policy. Long-range plan policy prioritizes preservation and maintenance needs, followed by operational improvements, then system expansion projects. This approach follows the lead of federal and both state departments of transportation. This “fix-it-first” policy allocates more funding to preserving and maintaining existing roadway and transit networks. The goal is to achieve and maintain a state-of-good repair for existing transportation infrastructure.

Table 8 identifies the target allocations for each funding category and resulting revenue for each. Funding within each category is allocated to both Major Regional Projects, which are listed in the Plan, and to smaller-scale projects as they are programmed in the TIP.

Together, roadway maintenance and preservation categories (pavement reconstruction and bridge replacement) comprise 80 percent of total roadway expenditures in Pennsylvania and 78.5 percent in New Jersey. In Pennsylvania, the transit preservation and maintenance categories (rail infrastructure replacement,

vehicle replacement, and station enhancement) account for 79.5 percent of transit expenditures; and in New Jersey, they account for 38.5 percent of transit expenditures. A higher percentage was allocated in Pennsylvania because it is a much larger and older system.

Even if all anticipated Plan revenues were directed toward preserving and maintaining the roadway and transit system, there would not be enough money to address the identified need. Furthermore, the region would not have funding for any other critical types of improvements to address congestion, safety, or mobility. With funding

projections down, and system preservation needs on the rise, only five percent was allocated for roadway system expansion projects in Pennsylvania and New Jersey, primarily for eliminating choke points in the network and improved connections between facilities. A larger percent of funding is reserved for operational improvements, which tend to have a higher return on congestion reduction than system expansion projects, per dollar spent. State-of-good-repair needs are a higher priority than system expansion for transit

in Pennsylvania. All transit state-of-good-repair and operational improvement needs were met in New Jersey, with the remaining 40 percent of funding going to system expansion.

Major Regional Project Evaluation

With scarce available funding, it is imperative to select projects wisely, based on a quantitative assessment. Investments in the system need to support the core principles of *Connections 2040*: Manage Growth and Protect the Environment; Invest

in Livable Communities; Build the Economy; and Establish a Modern Multimodal Transportation System. Investments also need to focus on modernizing the region's aging transportation system, while working toward other key goals, such as: rebuilding the existing system, reducing congestion, improving safety, increasing mobility options for people and goods, establishing a multimodal transportation network, and identifying additional funding.



EQUITY

COORDINATED HUMAN SERVICES TRANSPORTATION PLAN AND JARC/ NEW FREEDOM FUNDING

Many lower-income and transportation-disadvantaged people have a difficult time reaching many of the region's employment centers, which tend to be scattered in auto-dependent suburban areas. In order to bridge this gap, DVRPC has developed a Coordinated Human Services Transportation Plan (CHSTP). The CHSTP seeks to help improve transportation options and provide better service to transportation-disadvantaged riders. It includes a range of strategies and services that can help make it easier for targeted populations to use transit.

FTA and our state and regional partners have invested dedicated funds to help implement the CHSTP. The Job Access and Reverse Commute (JARC) program has helped fund transportation services and supportive activities that facilitate access to jobs for welfare recipients, lower-income persons, and reverse commuters. It has also supplemented the region's public transportation system, such as expanding early morning and evening services and providing shuttles connecting transit stations to employment sites. The New Freedom Initiative program has funded additional tools for disabled individuals seeking integration in the workforce and society. Typically, this is infrastructure beyond ADA requirements or travel training. Changes for both programs are anticipated under MAP-21, and DVRPC will continue to work with our planning partners to ensure that these types of investments are made in a coordinated way.

To determine which potential major regional system expansion projects are ultimately included in the fiscally constrained Funded Plan, DVRPC and its planning partners developed a screening and evaluation process to assess whether they meet key objectives of the Plan. The first step in the analysis is a screening 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.

Roadway 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.

Roadway projects that pass the screening are then further evaluated by the following criteria:

- ▶ Does the project serve the region's identified population and employment Centers?
- ▶ Are there significant environmental issues that will be impacted by a project, as measured by DVRPC's Environmental Screening Tool?
- ▶ Is the project located in a CMP Priority Subcorridor?
- ▶ What is the reduction in regional vehicle hours of travel (VHT) associated with this project?
- ▶ What is the average annual daily traffic multiplied by the peak-period volume-to-capacity (V/C) ratio within the project limits?
- ▶ What is the daily truck traffic on the facility?
- ▶ How far has the project advanced?

Transit system expansion projects are evaluated with the following criteria:

- ▶ Does the project serve areas that will support a high level of transit service, as measured by DVRPC's Transit Score Index?
- ▶ Does the project serve environmental justice communities with additional transit needs, as identified by DVRPC's Degrees of Disadvantage (DoD) analysis?
- ▶ What is the potential for transit-oriented development?
- ▶ What is the status of the project?
- ▶ Is the project located in a Congestion Management Process Priority Subcorridor?
- ▶ What is the project's anticipated farebox recovery rate?

System preservation and operational improvement projects were prioritized using asset management system condition data, use (vehicle and truck volumes, or transit ridership), detour length (for bridges), age, TIP status, speed impacts (for pavement), and functional class. DVRPC and its planning partners worked to optimize investments that get the longest life and system use out of infrastructure for the least cost.

THE TRUE COST OF BAD ROADS



The transportation research group, TRIP, estimates

that poor road conditions in the Greater Philadelphia region cost the average driver \$572 per year in costs for accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption, and tire wear. The basic maintenance involved in keeping a road in good condition costs anywhere from one-third to one-fourteenth of the cost of fixing a road that has fallen into disrepair. Thus, the more maintenance that is deferred now, the more disproportionately expensive it will become to eventually fix the problem. Meanwhile, poor road conditions continue to double tax drivers, where they must pay for the damage to their vehicles caused by poor road conditions, and then, again, to eventually repair the road.

Investing in the Future

This section identifies the Major Regional Projects that the region will need to undertake over the next 27 years.

There are separate tables for system preservation, operational improvements, bike and pedestrian, and system expansion projects for both roadways and transit. There is also a table for externally funded major regional projects. Each project is identified by facility, project scope and location, and completion date based on the end of the funding period that the project is expected to be complete. Project costs are given in Y-O-E dollars for funded projects, and in current year dollars for the unfunded projects that are part of the Vision Plan. System expansion projects are given a MAP ID that corresponds with the Transportation Vision Major Regional System Expansion Projects map (Figure 34).

These projects represent the largest and most significant set of identified needs out of the total set of projects that will need to be addressed over the life of the Plan. Many smaller-scale projects are already identified in the current Pennsylvania and New Jersey TIPs, and future iterations of the TIPs will identify future projects, of all sizes, as their need arises.

MAJOR REGIONAL ROADWAY PRESERVATION PROJECTS



The major regional preservation projects identified in the Vision Plan illustrate the scope and the scale of the effort to maintain the existing system. I-95 is a clear example of the difficult task of addressing the rebuilding of our infrastructure in a fiscally constrained environment. While the focus right now is on reconstructing the portion between Northern Liberties and Holmesburg in Philadelphia, the entire segment from Center City to the Delaware state line needs to be addressed during the Plan. Much of this segment of I-95 is a viaduct bridge structure, and many sections will be more than 70 years old by 2040, well beyond their 50-year design life. Strictly rebuilding the portion of this facility in-kind between Christian Street and Mifflin Street in South Philadelphia is estimated to cost \$440 million in 2013 dollars. Due to inflation, it will cost an estimated \$1 billion in Y-O-E dollars when it is scheduled for reconstruction. While this project is in the Funded Plan, much of the rest of the needed work is unfunded due to fiscal constraint. This includes several major I-95 bridges that will need major reconstruction



**TABLE 9:
MAJOR REGIONAL ROADWAY PRESERVATION PROJECTS**

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|--------------------------------------|--|----------------------|---------------|---|--|
| PA 611 | Reconstruct bridge over Neshaminy Creek | Bucks | Unfunded | | \$ 16.0 |
| US 1 Bypass | Reconstruct bridges over Norfolk Southern Line, and over Trenton Avenue and US 1 | Bucks | Unfunded | | \$ 45.0 |
| US 1 | Reconstruct bridge over Delaware Canal and Conrail Line | Bucks | Unfunded | | \$ 45.0 |
| PA 332 Newtown Bypass | Bridge over SEPTA | Bucks | Unfunded | | \$ 7.5 |
| Darby Road Extension | Replace and realign Valley Road Bridge to connect with Darby Road | Chester | 2025-2030 | \$ 32.6 | |
| US 30 Coatesville-Downingtown Bypass | Reconstruct from Reeceville Road to PA 10 | Chester | 2025-2040 | \$ 330.3 | |
| US 1 | Reconstruct from Schoolhouse Road to Maryland State Line | Chester | 2025-2040 | \$ 320.4 | |
| US 202 | Reconstruct bridges over Amtrak | Chester | Unfunded | | \$ 75.0 |
| US 422 | Reconstruct from PA 724 to Schuylkill River; reconstruct bridge over Schuylkill River, provide for Schuylkill River Trail crossing | Chester, Montgomery | 2025-2040 | \$ 180.4 | |
| I-95 Delaware County | Reconstruct bridges over Amtrak (northbound and southbound), over Chester Creek, over Bartram Avenue/Conrail, and over Sellers Avenue (northbound and southbound) | Delaware | Unfunded | | \$380.0 |
| I-476 | Reconstruct bridges over Avondale Road/Dicks Run (northbound and southbound); over Conestoga Rd. and Sproul Rd. (northbound and southbound); I-76 Schuylkill Expressway (northbound and southbound); and Conrail (northbound and southbound) | Delaware, Montgomery | Unfunded | | \$ 235.0 |
| US 1 | Reconstruct bridge over Wayne Junction | Philadelphia | 2019-2024 | \$ 78.3 | |
| US 422 | Reconstruct and realign from Porter Road to Park Road, including 2 bridges over Porter Road and Sanatoga Road and Creek, and Pleasantview Road and Park Road bridges over 422 | Montgomery | 2025-2040 | \$ 162.4 | |
| I-76 | Reconstruct eastbound bridge over City Avenue | Montgomery | 2025-2040 | \$ 27.6 | |
| I-76 | Reconstruct bridges over Norfolk Southern railway; City Avenue (westbound); South Gulph Road; and Arrowmink Creek | Montgomery | Unfunded | | \$ 160.0 |
| Bridges over Vine Street Expressway | Reconstruct Spring Garden Street Bridges over I-76 and the Schuylkill River; reconstruct 18th, 19th, 20th, 21st, and 22nd Street bridges, and 2 pedestrian walkways over the Vine Street Expressway. | Philadelphia | 2014-2024 | \$ 251.0 | |
| I-95 South Philadelphia | Reconstruct bridge over Pattison Avenue | Philadelphia | 2025-2040 | \$ 72.1 | |
| I-95 South Philadelphia | Reconstruct viaducts from Christian Street to Mifflin Street | Philadelphia | 2025-2040 | \$ 980.2 | |
| I-676 | Reconstruct bridge over Schuylkill River/CSX | Philadelphia | 2025-2040 | \$ 145.7 | |
| I-76 | Reconstruct bridge from Arch Street to University Avenue; between 34th and Grays Ferry Avenue; and over Schuylkill River/CSX | Philadelphia | Unfunded | | \$ 470.0 |
| I-95 South Philadelphia | Reconstruct viaducts from Shunk Street to Mifflin Street; CSX track east of Broad Street; from Stadiums to Navy Yard; and over Penrose Avenue/Mingo Creek (northbound and southbound), and over Terminal Avenue | Philadelphia | Unfunded | | \$ 1,260.0 |
| I-95 Girard Point Bridge | Reconstruct double-decker bridge | Philadelphia | Unfunded | | \$ 400.0 |
| I-676 | Reconstruct 7th Street and 8th Street ramps | Philadelphia | Unfunded | | \$ 35.0 |

SOURCE: DVRPC

CONTINUED ON NEXT PAGE



TABLE 9 CONTINUED

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|----------|---|------------|-----------|---------------------------------------|--|
| NJ 38 | Reconstruct bridge over NJ Turnpike | Burlington | 2024-2040 | \$ 151.3 | |
| NJ 70 | Reconstruct from MP 0 to MP 7.7 | Camden | 2014-2023 | \$ 33.1 | |
| I-676 | Reconstruct from CR 537 to US 30 | Camden | 2024-2040 | \$ 47.5 | |
| I-76 | Reconstruct from I-676 to I-295 | Camden | 2024-2040 | \$ 85.8 | |
| I-676 | Rehabilitate viaduct over local streets in Camden City south of US 30 | Camden | 2024-2040 | \$ 103.5 | |
| I-676 | Rehabilitate bridge over Conrail | Camden | 2024-2040 | \$ 83.4 | |
| US 1 | Rehabilitate bridge over D & R Canal | Mercer | 2024-2040 | \$ 74.5 | |

SOURCE: DVRPC

between now and 2040. Another major facility, the I-76 bridge over the Schuylkill River, also cannot be addressed in the Funded Plan.

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Other significant regional roadway reconstruction projects will occur on US 422 in Chester and Montgomery counties, I-676 in Camden City, and a number of bridges on both I-76 and I-476.



MAJOR REGIONAL ROADWAY OPERATIONAL IMPROVEMENT PROJECTS



Operational improvements will make the existing transportation system work more efficiently. In many cases, these projects make interchange improvements that will improve the flow of traffic, or directly connect facilities, and help to remove traffic from local streets. Examples of this type of project are the I-95 and I-476, and I-476 and I-76 interchange improvements. US 202 intersection improvements at US 1 and PA 926 is the result of ‘right-sizing’ a former widening and grade-separated interchange project into an affordable short-term project that can improve safety and reduce congestion.

The conversion of the NJ 29 Freeway into an urban boulevard will improve walkability, increase safety, enhance access to the Delaware River, and promote redevelopment in the City of Trenton.

Major regional operational improvement projects focus on physical changes to the roadway system. DVRPC and its planning partners developed a *Transportation Operations Master Plan* (TOMP) that details specific Intelligent Transportation Systems (ITS), traffic management, and signal improvement projects. Only about 60 percent of the projects identified in the TOMP can be funded in the Plan.



**TABLE 10:
MAJOR REGIONAL ROADWAY OPERATIONAL IMPROVEMENT PROJECTS**

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST <i>(MILLIONS IN Y-O-E \$)</i> | UNFUNDED COST <i>(MILLIONS IN 2013 \$)</i> |
|---|---|--------------------|---------------|---|--|
| US 202 (Section 100) Intersection Improvements | At PA 926 and US 1 | Chester, Delaware | 2014-2018 | \$ 6.1 | |
| I-95 and I-476 | One new lane in each direction on I-95 through interchange. Addition of lane on ramp from SB I-476 to SB I-95 and addition of lane on ramp from NB I-95 to NB I-476 | Delaware | 2025-2040 | \$ 214.3 | |
| US 1 at PA 352 | Reconstruction of cloverleaf interchange, remove lane drops | Delaware | 2014-2030 | \$ 163.7 | |
| US 202 (Section 500) Markley Street | Reconstruction from Main St. to Johnson Highway; Add center turn lane between Marshall St. and Johnson Highway | Montgomery | 2014-2018 | \$ 28.3 | |
| Ridge Pike | Reconstruct from Butler Pike to I-276 PA Turnpike; Add center turn lane | Montgomery | 2025-2040 | \$ 57.1 | |
| I-476 and I-76 | Interchange modifications | Montgomery | 2025-2040 | \$ 20.0 | |
| I-76 at PA 23 Matsonford Road | Interchange modifications | Montgomery | 2025-2040 | \$ 20.0 | |
| US 422 at Sanatoga Interchange | Interchange modifications | Montgomery | 2025-2040 | \$ 18.0 | |
| US 422 | Reconstruct from Berks County line to Schuylkill River Bridge; Reconfigure "S" curve in West Pottsgrove; and realign Stowe interchange | Montgomery | 2025-2040 | \$ 185.8 | |
| I-276 at PA 611 Willow Grove | Interchange modifications | Montgomery | 2025-2040 | \$ 40.1 | |
| I-95 Philadelphia North | Reconstruct from Northern Liberties to Holmesburg; Interchange improvements at Vine, Girard, Allegheny, Betsy Ross Bridge, Bridge, and Cottman interchanges | Philadelphia | 2014-2024 | \$ 2,140.0 | |
| South Pemberton Road (CR 530) | Add new center turn lane and shoulder from Hanover St. (CR 616) to US 206 | Burlington | 2014-2017 | \$ 27.0 | |
| NJ 70 | Operational/safety improvements from NJ 38 to NJ 73; Intersection improvements at Kingston Rd. and Covered Bridge Rd. | Burlington, Camden | 2024-2040 | \$ 390.5 | |
| US 130 & CR 551 (Brooklawn Circle) | Redesign intersection at Brooklawn Circle | Camden | 2014-2017 | \$ 4.5 | |
| NJ 29 | Convert to an urban boulevard from US 1 to Sullivan Way | Mercer | 2024-2040 | \$ 346.0 | |
| Princeton-Hightstown Road Improvements (CR 571) | Widening, reconstruction and signals from Wallace-Cranbury Rd. to Clarksville Rd. | Mercer | 2014-2023 | \$ 10.7 | |

SOURCE: DVRPC



TABLE 11:
MAJOR REGIONAL BIKE AND PEDESTRIAN PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|-----------------------------|-----------------------------------|------------------------|-----------|---------------------------------------|--|
| The Circuit in Pennsylvania | Complete 272 multiuse trail miles | Pennsylvania Subregion | 2014-2040 | \$ 128.3 | \$ 47.2 |
| The Circuit in New Jersey | Complete 140 multiuse trail miles | New Jersey Subregion | 2014-2040 | \$ 99.7 | \$ 19.7 |

SOURCE: DVRPC

MAJOR REGIONAL BIKE AND PEDESTRIAN PROJECTS



Connections 2040 focuses bike and pedestrian improvements on completing a 750-mile regional trail network, The Circuit. About 250-miles of this system are complete, and 50-miles are under construction. While not completed with public funding by 2040, the region may be able to leverage private funding in order to advance the entire vision by 2040, or earlier.

MAJOR REGIONAL ROADWAY SYSTEM EXPANSION PROJECTS



Though limited in scope, the system expansion transportation investments included in the Plan support its land use, environmental, and economic development goals. Many of these projects will also help to rebuild the system, while expanding it. A number of the major regional highway projects improve system

operations by eliminating bottlenecks or bridging gaps. The new I-95 and Pennsylvania Turnpike Interchange (Map ID 2) addresses the missing movement between these two critical elements of the region’s highway system. The Adams Avenue Connector (Map ID 31) provides connection between I-95 and the Betsy Ross Bridge. Similarly, the I-295 and I-76/NJ 42 direct connection (Map ID 35) and missing movements (Map ID 36) projects complete this critical interchange and improve the functionality and safety of the network. Each of these will help to facilitate goods movement within and through the region.

Other system expansion projects improve the region’s economic competitiveness. The Penrose Avenue/26th Street (Map ID 29) access road improves mobility to the Navy Yard, which is one of the region’s largest brownfield redevelopment

areas. The North Delaware Avenue extension (Map ID 30) provides access to planned residential and recreational facilities.

The Lafayette/Ridge interchange (Map ID 21) will provide direct access from the Pennsylvania Turnpike to Norristown, one of the region’s town centers. A number of improved movements and new exits along the Pennsylvania Turnpike to give better access to a number of key regional business centers are proposed, but not funded, in the Plan. These projects would support the redevelopment of already developed areas and allow the turnpike to become more of a regional beltway. These projects offer the potential of becoming a public-private partnership between PennDOT, the Pennsylvania Turnpike, and local property owners.



**TABLE 12:
MAJOR REGIONAL ROADWAY SYSTEM EXPANSION PROJECTS**

| MAP ID | FACILITY | PROJECT SCOPE | LOCATION | TIMING | SYSTEM EXPANSION COST (MILLIONS IN Y-O-E \$) | TOTAL FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|--------|---|---|---------------------|-----------|---|---|--|
| 1 | County Line Road | Widen and reconstruct from PA 309 to PA 611 | Bucks | 2014-2018 | \$ 12.2 | \$ 25.4 | |
| 2 | I-95 at PA Turnpike | New partial interchange at I-276 (PA Turnpike); Widen PA Turnpike from US 1 to New Jersey; Widen I-95 from PA 413 to PA Turnpike | Bucks | 2014-2024 | \$ 113.4 | \$ 166.8 | |
| 3 | US 1 | Reconstruct from I-276 (PA Turnpike) to NJ State Line; Widen from PA Turnpike to PA 413; Interchange improvements | Bucks | 2025-2040 | \$ 102.6 | \$ 410.6 | |
| 4 | I-95 Bucks County Hard Shoulder Running | Southbound from Street Road (Exit 37) to Cornwell Heights SEPTA station | Bucks | Unfunded | | | \$ 1.6 |
| 5 | PA 309 Connector Road (Phase 2) | Construct new road between Allentown Road and County Line Road; Interchange improvements at PA 309 | Bucks, Montgomery | 2025-2040 | \$ 46.6 | \$ 62.1 | |
| 6 | French Creek Parkway | Construct new road between PA 23 and PA 29 | Chester | 2025-2040 | \$ 52.2 | \$ 52.2 | |
| 7 | PA 100 | Widen from Shoen Road to Gordon Road | Chester | 2014-2018 | \$ 7.3 | \$ 11.9 | |
| 8 | US 202 (Section 300) | Widen and reconstruct from PA 252 to US 30 | Chester | 2014-2018 | \$ 20.2 | \$ 77.8 | |
| 9 | US 30/Coatesville-Downingtown Bypass | Interchange improvements at Airport Rd. and PA 113 | Chester | 2025-2040 | \$ 37.8 | \$ 37.8 | |
| 10 | US 30/Coatesville-Downingtown Bypass | Widen and reconstruct from US 30 Business/Exton Bypass to Reeceville Road | Chester | Unfunded | | | \$ 250.7 |
| 11 | US 202 (Section 100) | Widen from West Chester to Delaware State Line; Grade-separated interchange at US 1 | Chester, Delaware | Unfunded | | | \$ 300.0 |
| 12 | US 322 | Widen and reconstruct from US 1 to I-95 | Delaware | 2014-2024 | \$93.7 | \$ 239.9 | |
| 13 | I-476 Hard Shoulder Running | From PA 3 to I-95 | Delaware | 2025-2040 | \$ 22.6 | \$ 22.6 | |
| 14 | I-95/US 322/Highland Avenue Interchange | Realign I-95 and add new movements at interchange to 322, Bethel Road, and Highland Avenue | Delaware | 2025-2040 | \$ 22.5 | \$ 150.2 | |
| 15 | I-95 Delaware County Hard Shoulder Running | Southbound from I-476 to US 322 (Exit 7 to Exit 4), and northbound Delaware State Line to US 322 West (Exit 3) | Delaware | Unfunded | | | \$ 6.5 |
| 16 | Lafayette Street | Roadway extension from Barbadoes St. to Diamond Avenue | Montgomery | 2014-2024 | \$ 20.6 | \$ 41.1 | |
| 17 | US 202 (Section 600) | Widen and reconstruct from Johnson Highway to PA 309 | Montgomery | 2014-2024 | \$ 112.8 | \$ 201.5 | |
| 18 | US 422 at PA 363 Interchange (River Crossing) | Add full movements | Montgomery | 2014-2018 | \$ 3.1 | \$ 12.3 | |
| 19 | US 422 Bridge at PA 23 Interchange (River Crossing) | Bridge replacement and widening over Schuylkill River - existing bridge is 5 lanes, new bridge will have 6 lanes; Intersection/interchange improvements | Montgomery | 2014-2024 | \$ 77.6 | \$ 151.3 | |
| 20 | US 422 Mainline Widening (River Crossing) | Widen from 4 to 6 lanes from US 202 to PA 363 | Chester, Montgomery | 2025-2040 | \$ 33.8 | \$ 67.7 | |

SOURCE: DVRPC

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TABLE 12 CONTINUED

| MAP ID | FACILITY | PROJECT SCOPE | LOCATION | TIMING | SYSTEM EXPANSION COST (MILLIONS IN Y-O-E \$) | TOTAL FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|--------|---|--|--------------------|-----------|---|---|--|
| 21 | I-276 at Lafayette Street/Ridge Avenue | New interchange | Montgomery | 2025-2040 | \$ 59.3 | \$ 74.1 | |
| 22 | I-276/I-76 Valley Forge Interchange | Interchange modifications | Montgomery | Unfunded | | | \$ 20.0 |
| 23 | I-276 at Virginia Drive | Add full movements | Montgomery | Unfunded | | | \$ 45.0 |
| 24 | I-276 at Henderson Road | New interchange | Montgomery | Unfunded | | | \$ 40.0 |
| 25 | US 202 Dannehower Bridge and Lafayette Street | New interchange | Montgomery | Unfunded | | | \$ 53.7 |
| 26 | I-276 at PA 611 | Interchange modifications | Montgomery | Unfunded | | | 20.0 |
| 27 | US 422 Hard Shoulder Running | From PA 363 to PA 29 | Montgomery | Unfunded | | | \$ 6.8 |
| 28 | I-276 at PA 63 (Welsh Road) | New interchange | Montgomery | Unfunded | | | \$ 40.0 |
| 29 | Penrose Avenue/ 26th Street | New access road to Navy Yard business center | Philadelphia | 2014-2018 | \$ 6.8 | \$ 6.8 | |
| 30 | North Delaware Avenue | Extend road from Lewis Street to Bridge Street | Philadelphia | 2014-2018 | \$ 13.0 | \$ 13.0 | |
| 31 | Adams Avenue Connector | Extend road to new ramps at I-95 and Aramingo Avenue | Philadelphia | 2019-2024 | \$ 26.8 | \$ 26.8 | |
| 32 | I-95 Philadelphia Hard Shoulder Running | Southbound From Woodhaven Road to Cottman/Princeton Avenue (Exit 35 to Exit 30); Northbound from I-76 to I-676 (Exit 19 to Exit 22); and I-76 to Broad Street (Exit 19 to Exit 17) | Philadelphia | Unfunded | | | \$ 10.8 |
| 33 | I-76 Hard Shoulder Running | I-676 to Girard Avenue | Philadelphia | Unfunded | | | \$ 0.6 |
| 34 | I-295 at NJ 38 | Add missing movements to interchange at NJ 38 | Burlington | Unfunded | | | \$ 126.5 |
| 35 | I-295 (Direct Connect) | Direct connection of I-295 through interchange at I-76/NJ 42 | Camden | 2014-2023 | \$ 255.0 | \$ 543.8 | |
| 36 | I-295 at I-76/NJ 42 | Add missing movements to interchange at I-76/NJ 42 | Camden, Gloucester | 2014-2023 | \$ 67.0 | \$ 133.9 | |
| 37 | US 322 | Widen from US 130 to NJ Turnpike | Gloucester | 2024-2040 | \$ 45.8 | \$ 91.7 | |
| 38 | US 1 - Penns Neck Area | New connector road, interchanges and widening in vicinity of Penns Neck | Mercer | Unfunded | | | \$ 177.4 |
| 39 | Vaughn Drive Connector | Extend Vaughn Drive to Princeton Hightstown Road (CR 571) | Mercer | 2024-2040 | \$ 57.8 | \$ 57.8 | |

SOURCE: DVRPC

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**MAJOR REGIONAL TRANSIT SYSTEM
PRESERVATION PROJECTS**



Major regional transit preservation projects will occur on the Atlantic City Rail Line (vehicles, stations, and rail infrastructure), and a number of key SEPTA bridges and power substations, which are critical to the long-term viability of the

regional rail system. While work has begun on City Hall Station, the overall project won't be completed until 2030, due to funding constraints. The Plan does not envision procuring any new rail vehicles over the next 27 years, due to lack of funding. There is a need to replace the 163 Silverliner IV regional rail vehicles,

Norristown High Speed Line vehicles, trolleys, trackless trolleys, locomotives, and some additional buses to maintain vehicles within reasonable service life. A larger than existing fleet purchase of trolley and regional rail vehicles is needed to reduce system overcrowding.



**TABLE 13:
MAJOR REGIONAL TRANSIT SYSTEM PRESERVATION PROJECTS**

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|--|---|---|-----------|---------------------------------------|--|
| SEPTA Regional Rail Lines | Automatic Train Control | Pennsylvania Subregion | 2014-2018 | \$ 106.6 | |
| Media, Norristown, Warminster, Fox Chase Lines | Catenary and catenary structure replacement projects | Bucks, Delaware, Montgomery, Philadelphia | 2014-2018 | \$ 15.5 | |
| Chestnut Hill East Line | Rehabilitate bridges | Philadelphia | 2025-2040 | \$ 40.5 | |
| Chestnut Hill West Line | Rehabilitate bridge 0.35 | Philadelphia | 2019-2024 | \$ 5.5 | |
| Chestnut Hill West Line | Rehabilitate bridges | Philadelphia | 2025-2040 | \$ 44.1 | |
| Media-Elwyn Line | Bridge timber replacement and painting | Delaware | 2025-2040 | \$ 18.3 | |
| Regional Rail Stone Arch Bridges | Rehabilitation | Philadelphia | 2025-2040 | \$ 6.2 | |
| Media-Elwyn Line | Reconstruct Crum Creek Viaduct | Delaware | 2019-2024 | \$ 59.0 | |
| Norristown High Speed Line | Rehabilitate Bridgeport Viaduct over Schuylkill River | Montgomery | 2025-2040 | \$ 33.8 | |
| Norristown High Speed Line | Rehabilitate bridge 0.15 near 69th Street Transportation Center | Delaware | 2025-2040 | \$ 22.0 | |
| Norristown High Speed Line | Tie and signal replacements; slope stability projects | Delaware, Montgomery | 2025-2040 | \$ 70.9 | |
| 30th Street Rail Yard | Catenary and structure replacement | Philadelphia | 2025-2040 | \$ 111.2 | |

SOURCE: DVRPC

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TABLE 13 CONTINUED

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|--|--|--------------------------|-----------|---------------------------------------|--|
| Substations at Jenkintown, Lenni, Morton, Wayne Junction, Bethayres, Chestnut Hill East, Ambler, Doylestown, Hatboro, Clifton, and Along the Market-Frankford Line | Substation replacements and rehabilitations | Pennsylvania Subregion | 2014-2030 | \$ 162.4 | |
| Trenton, Wilmington, and Paoli-Thorndale Lines | Amtrak lease agreements for trackage rights | Region | 2014-2040 | \$ 1,541.5 | |
| Jenkintown Static Frequency Converter | Rehabilitate | Montgomery | Unfunded | | \$ 30.6 |
| Woodbourne Traction & Signal Substations | New substation | Bucks | Unfunded | | \$ 34.0 |
| Mainline Bridge Program | Bridge rehabilitations | Montgomery, Philadelphia | Unfunded | | \$ 53.3 |
| NJ Transit Buses | Procure 358 40' transit buses and 288 45' cruiser buses | New Jersey Subregion | 2014-2040 | \$ 539.4 | |
| Midvale | New rail shop | Philadelphia | 2025-2040 | \$ 222.8 | |
| Atlantic City Rail Line | Replace rail cars and locomotives, rehabilitate Cherry Hill, Atco, and Lindenwold stations | Camden, Philadelphia | 2025-2040 | \$ 284.6 | |
| New Jersey Transit Northeast Corridor Rail Vehicles | Replace 42 commuter rail vehicles | Mercer | 2025-2040 | \$ 470.1 | |
| SEPTA Buses | Replace 2,216 40' and 255 60' buses | Pennsylvania Subregion | 2014-2040 | \$ 3,073.3 | |
| Berridge; Callowhill; 69th Street Transportation Center; Overbrook; Fern Rock; Comly; Woodland; Frontier; Roberts; and Powelton Facilities | Roof replacements | Delaware, Philadelphia | 2025-2040 | \$ 94.8 | |
| Callowhill Shop | Facility replacement | Philadelphia | 2025-2040 | \$ 278.5 | |
| Rail Yard Storage | Expansion program | Pennsylvania Subregion | 2025-2040 | \$ 76.9 | |
| SEPTA Commuter Rail Vehicles | Purchase 245 Silverliner VIs | Pennsylvania Subregion | Unfunded | | \$ 1,900.0 |
| SEPTA Trolleys | Purchase 115 trolleys and 55 articulated trolleys | Delaware, Philadelphia | Unfunded | | \$ 1,005.0 |
| Broad Street Line Vehicles | Rehabilitate 125 heavy rail vehicles | Philadelphia | Unfunded | | \$ 1,050.0 |
| SEPTA Buses | Replace 44 40' buses and 38 trackless trolleys | Pennsylvania Subregion | Unfunded | | \$ 57.2 |
| SEPTA Locomotives | Replace 9 diesel/electric locomotives | Philadelphia | Unfunded | | \$ 95.9 |
| Margaret-Orthodox (MFL), Erie (BSL), Snyder (BSL), 40th Street (MFL), 69th Street Transportation Center (MFL), and Cecil B. Moore (BSL) | Station accessibility improvements | Delaware, Philadelphia | 2025-2040 | \$ 102.5 | |
| City Hall Station | Renovation | Philadelphia | 2014-2040 | \$ 117.6 | |
| Exton Station | Renovation | Chester | 2025-2040 | \$ 17.7 | |
| 5th Street Station | Renovation | Philadelphia | 2025-2040 | \$ 25.6 | |
| Paoli Station | Transportation center enhancements | Chester | 2025-2040 | \$ 46.3 | |

SOURCE: DVRPC

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TABLE 13 CONTINUED

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|--|---|-------------------------------|-----------|---------------------------------------|--|
| Ardmore Station | Transportation center enhancements | Montgomery | 2025-2040 | \$ 10.6 | |
| Fern Rock Station | Transportation center enhancements | Philadelphia | Unfunded | | \$ 77.2 |
| Levittown Station | Renovation | Bucks | 2025-2040 | \$ 25.6 | |
| Villanova Station | Renovation | Delaware | 2025-2040 | \$ 33.0 | |
| Wynnewood Station | Renovation | Montgomery | Unfunded | | \$ 20.0 |
| Devon Station | Renovation | Chester | Unfunded | | \$ 20.0 |
| Secane Station | Renovation | Delaware | Unfunded | | \$ 22.5 |
| Gwynedd Valley, North Wales, and Philmont Stations | Regional rail parking expansions | Montgomery | Unfunded | | \$ 10.3 |
| Noble, Elkins Park, Roslyn, Hatboro, East Falls, and Willow Grove Stations | Regional rail station enhancements | Bucks, Montgomery | Unfunded | | \$ 32.0 |
| 69th Street Transportation Center | Build parking structure, transportation center enhancements | Delaware | 2025-2040 | \$ 25.9 | |
| AT&T, Wyoming, Fairmount, and Hunting Park Stations | Broad Street Line station program | Philadelphia | Unfunded | | \$ 28.5 |
| Ridge and Summit, 5th and Godfrey, 61st and Pine, and Wycombe | Bus and trolley loop program | Delaware, Philadelphia | Unfunded | | \$ 6.6 |
| SEPTA Routes 101 and 102 | Signals and interlocking improvements | Delaware | 2014-2018 | \$ 33.0 | |
| Broad Street and Market-Frankford Lines | Communications systems | Delaware, Philadelphia | 2025-2040 | \$ 52.6 | |
| Paoli-Thorndale Line | Signal and switch improvements | Chester, Delaware, Montgomery | 2025-2040 | \$ 71.8 | |
| Broad Street Spur | Signal replacements | Philadelphia | 2025-2040 | \$ 11.0 | |

SOURCE: DVRPC

MAJOR REGIONAL TRANSIT OPERATIONAL IMPROVEMENT PROJECTS



Major regional transit system operational improvement projects are envisioned along the Atlantic City Line, where new sidings, additional vehicles, and station enhancements will allow for increased service frequency. SEPTA's fare modernization project will give the region

the most advanced payment system in the country. Automatic train control will meet federal rail safety requirements.

Bus and trolley signal prioritization will help to speed up service. This will encourage ridership and should reduce operating expenses.



NEW PAYMENT TECHNOLOGY

PHOTO: SEPTA



TABLE 14:
MAJOR REGIONAL TRANSIT OPERATIONAL IMPROVEMENT PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|--|---|---|-----------|---------------------------------------|--|
| Atlantic City Rail Line Service Frequency Improvements | Siding and station improvements, new vehicles for increased service frequency | Camden | 2025-2040 | \$ 152.4 | |
| Fare Modernization | New fare payment technologies at SEPTA for all modes | Pennsylvania Subregion | 2014-2018 | \$ 207.5 | |
| Regional Rail System - Core Capacity Program | A core capacity program of projects to increase the speed and frequency of the Regional Rail system. Projects include interlockings, sidings, flyovers, and freight separation projects | Bucks, Delaware, Montgomery, Philadelphia | Unfunded | | \$ 710.0 |
| Route 23 and 56 Trolley Restoration | Trolley vehicle purchase and improvements for entire routes | Philadelphia | Unfunded | | \$ 319.0 |

SOURCE: DVRPC

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}). Therefore, 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 travel 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. DVRPC has successfully demonstrated the transportation conformity of *Connections 2040* and the Pennsylvania and New Jersey TIPs in accordance with the corresponding state implementation plans and Clean Air Act requirements.

MAJOR REGIONAL TRANSIT SYSTEM EXPANSION PROJECTS



Unfortunately, the backlog of transit system preservation needs mean no system expansion projects can be afforded in the Pennsylvania subregion at this time. Some of the projects identified in the Vision

Plan could progress if additional funding were to become available.

In New Jersey, the Plan funds two new bus rapid transit (BRT) lines and begins construction on one rail line. The South Jersey BRT (Map ID 50) will run along NJ 42

and NJ 55 in Gloucester County into Center City, Philadelphia. The US 1 BRT (Map ID 52) contains a number of new bus routes in Mercer County. The Glassboro-Camden line (Map ID 51) would be under construction, but not operational, in 2040.



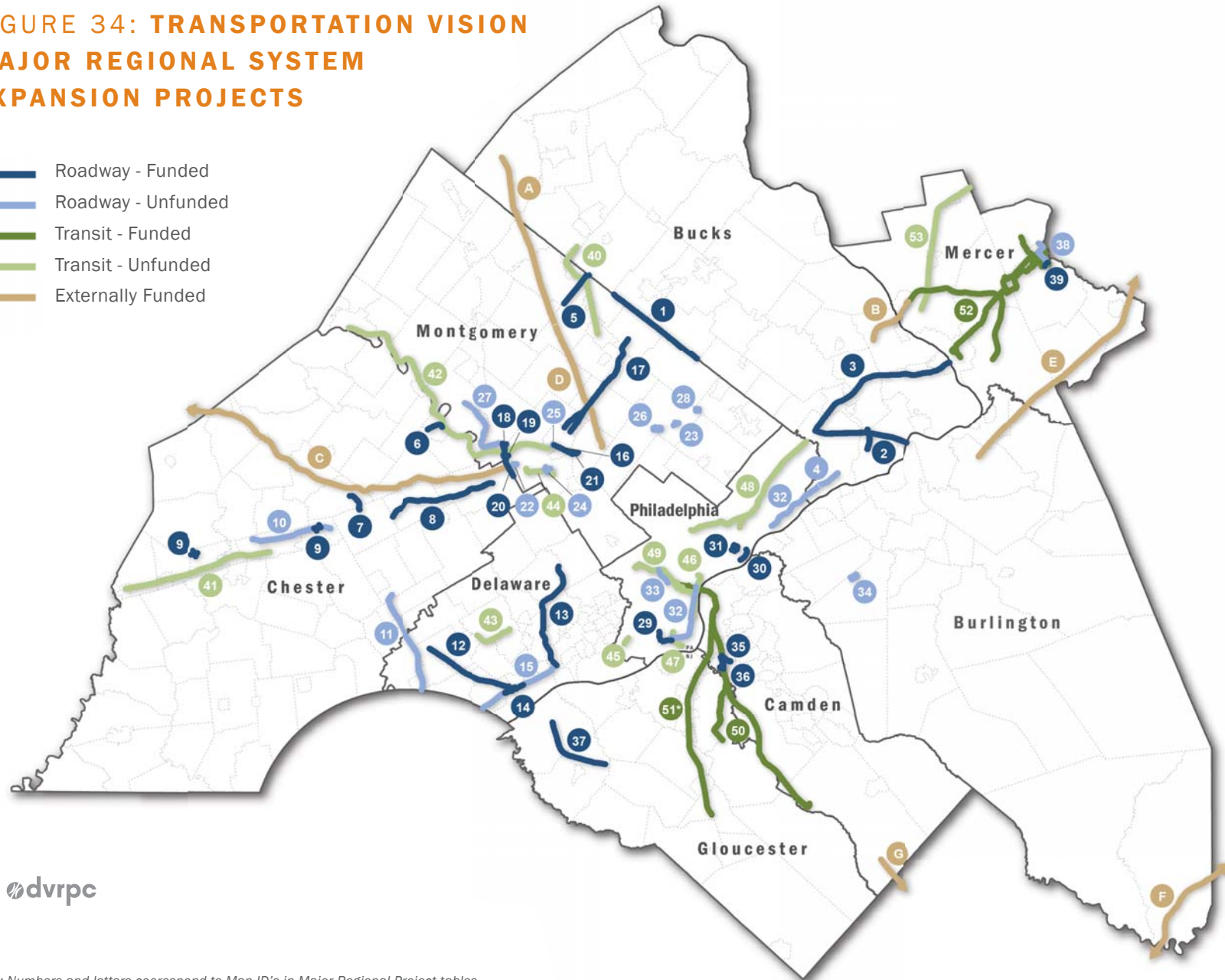
TABLE 15: MAJOR REGIONAL TRANSIT SYSTEM EXPANSION PROJECTS

| MAP ID | FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST (MILLIONS IN Y-O-E \$) | UNFUNDED COST (MILLIONS IN 2013 \$) |
|--------|----------------------------|--|----------------------------------|---|---------------------------------------|--|
| 40 | Pennridge Line | Lansdale Line extension to Pennridge, PA | Bucks, Montgomery | Unfunded | | \$ 182.0 |
| 41 | Atglen Line | Paoli-Thorndale Line extension to Atglen | Chester | Unfunded | | \$ 55.0 |
| 42 | Pottstown Line | Norristown Line extension to Pottstown, PA | Chester, Montgomery | Unfunded | | \$ 500.0 |
| 43 | Wawa Line | Media-Elwyn Line extension to Wawa, PA | Delaware | Unfunded | | \$ 91.4 |
| 44 | Norristown High Speed Line | Rail line extension from Hughes Park to King of Prussia | Montgomery | Unfunded | | \$ 400.0 |
| 45 | Airport Line/Route 36 | New Airport Line Station at Eastwick and extend Route 36 | Philadelphia | Unfunded | | \$ 36.0 |
| 46 | Delaware Ave. Line | New transit line within Philadelphia | Philadelphia | Unfunded | | \$ 850.0 |
| 47 | Broad Street Line | Broad Street Line extension from AT&T Station to the Navy Yard | Philadelphia | Unfunded | | \$ 429.0 |
| 48 | Roosevelt Boulevard Line | New transit line along Roosevelt Boulevard from Lower Bucks County to Frankford Transportation Center and Broad Street | Philadelphia | Unfunded | | \$ 67.0 |
| 49 | Cultural Connector | New transit line along City Branch to Centennial District | Philadelphia | Unfunded | | \$ 258.0 |
| 50 | South Jersey BRT | New BRT from Avandale Park and Ride and Delsea Drive to Center City Philadelphia | Camden, Gloucester, Philadelphia | 2014-2023 | \$ 46.0 | |
| 51 | Glassboro-Camden Line | New transit line from Camden to Gloucester County | Camden, Gloucester | Under construction, not operational in 2040 | \$ 2,084.9 | \$ 528.0 |
| 52 | US 1 BRT | New bus rapid transit service in central New Jersey along US 1 Corridor | Mercer | 2025-2040 | \$ 494.3 | |
| 53 | West Trenton Line | New line from West Trenton Station to Bridgewater, NJ; Relocate West Trenton Station to near Parkway Avenue TOD | Mercer | Unfunded | | \$ 110.0 |

SOURCE: DVRPC

**FIGURE 34: TRANSPORTATION VISION
MAJOR REGIONAL SYSTEM
EXPANSION PROJECTS**

- Roadway - Funded
- Roadway - Unfunded
- Transit - Funded
- Transit - Unfunded
- Externally Funded



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Note: Numbers and letters correspond to Map ID's in Major Regional Project tables.
* Project is partially funded in the fiscally constrained plan. It will be under construction but not operational in 2040.

- 1 County Line Road
- 2 I-95 at PA Turnpike
- 3 US 1
- 4 I-95 Bucks County Hard Shoulder Running
- 5 PA 309 Connector Road
- 6 French Creek Parkway
- 7 PA 100
- 8 US 202 (Section 300)
- 9 US 30/Coatesville-Downingtown Bypass Interchange Improvements
- 10 US 30/Coatesville-Downingtown Bypass Widening
- 11 US 202 (Section 100)
- 12 US 322
- 13 I-476 Hard Shoulder Running
- 14 I-95 / US 322 / Highland Avenue Interchange
- 15 I-95 Delaware County Hard Shoulder Running
- 16 Lafayette Street
- 17 US 202 (Section 600)
- 18 US 422 at PA 363 Interchange (River Crossing)
- 19 US 422 Bridge at PA 23 Interchange (River Crossing)
- 20 US 422 Mainline Widening (River Crossing)
- 21 I-276 at Lafayette Street/Ridge Avenue
- 22 I-276/I-76 Valley Forge Interchange
- 23 I-276 at Virginia Drive
- 24 I-276 at Henderson Road
- 25 US 202 Dannehower Bridge and Lafayette Street
- 26 I-276 at PA 611
- 27 US 422 Hard Shoulder Running
- 28 I-276 at PA 63 (Welsh Road)
- 29 Penrose Avenue/26th Street
- 30 North Delaware Avenue

- 31 Adams Avenue Connector
- 32 I-95 Philadelphia Hard Shoulder Running
- 33 I-76 Hard Shoulder Running
- 34 I-295 at NJ 38
- 35 I-295 (Direct Connect)
- 36 I-295 at I-76/NJ 42
- 37 US 322
- 38 US 1 - Penns Neck Area
- 39 Vaughn Drive Connector
- 40 Pennridge Line
- 41 Atglen Line
- 42 Pottstown Line
- 43 Wawa Line
- 44 Norristown High Speed Line
- 45 Airport Line/Route 36
- 46 Delaware Avenue Line
- 47 Broad Street Line
- 48 Roosevelt Boulevard Line
- 49 Cultural Connector
- 50 South Jersey BRT
- 51* Glassboro-Camden Line
- 52 US 1 BRT
- 53 West Trenton Line
- A I-476 (PA Turnpike Northeast Extension)
- B I-95 at Scudders Falls Bridge
- C I-76 (PA Turnpike)
- D I-476 (PA Turnpike Northeast Extension)
- E New Jersey Turnpike
- F Garden State Parkway
- G Atlantic City Expressway



SUSTAINABILITY

SEPTA REGENERATIVE BRAKING

Transit service is inherently sustainable by emitting less pollution per passenger mile than cars, and by supporting denser, more efficient development patterns. The region’s transit operators have demonstrated a commitment to become even more sustainable by reducing energy use through a number of innovative efforts.

Most significantly, SEPTA has developed an aggressive program to utilize regenerative braking technologies to feed energy back into its vehicle fleets. Hybrid buses, trains, and trolleys all now utilize regenerative braking for auxiliary power (monitors, displays, lighting, heating, and cooling) and vehicle acceleration. Of note, SEPTA’s hybrid electric buses are 40 percent more energy-efficient than its diesel buses, in large part because they perform particularly well in the stop-and-go driving that comprises much of the SEPTA service area. On the rails, new Silverliner Vs are much more energy efficient (99.5 percent power transmission capture) than the Silverliner II and III fleets they replaced (76.5 percent power transmission capture). Overall, SEPTA estimates that the vehicle energy-efficiency efforts have reduced energy costs by nearly \$7 million per year.

SEPTA is now taking regenerative braking to the next level by capturing and storing it for other uses – namely, feeding it back into the energy grid. By reselling energy through the demand response and frequency regulation markets, SEPTA created new revenue streams to support its operations. One of these devices has already been installed at a substation along the Market-Frankford Line, and a second is on the way. There are more than two dozen other substations where this technology could be applied in the future.

TABLE 16:
EXTERNALLY FUNDED MAJOR REGIONAL PROJECTS

| MAP ID | FACILITY | PROJECT SCOPE | LOCATION | TIMING | COST (MILLIONS IN 2013 \$) |
|--------|---|--|---------------------|-----------|-------------------------------|
| A | I-476 (PA Turnpike Northeast Extension) | Widen to 6 lanes from Lansdale to Quakertown | Bucks, Montgomery | 2025-2040 | \$ 665.0 |
| B | I-95 at Scudders Falls Bridge | Widen I-95 from PA 332 to the Delaware River Bridge; Replace and widen the Delaware River Bridge; Reconfigure I-95 interchanges at Taylorsville Road and NJ 29; and repave I-95 from PA 332 to CR 579 (Bear Tavern Road) | Bucks, Mercer | 2014-2018 | \$ 328.6 |
| C | I-76 (PA Turnpike) | Widen to 6 lanes from Morgantown, Berks County to Valley Forge | Chester, Montgomery | 2019-2024 | \$ 300.0 |
| D | I-476 (PA Turnpike Northeast Extension) | Widen to 6 lanes from Mid-County to Lansdale interchanges | Montgomery | 2014-2018 | \$ 246.5 |
| E | New Jersey Turnpike | Widen from Exit 6 to Exit 9 | Burlington, Mercer | 2014-2017 | \$ 2,500.0 |
| F | Garden State Parkway | Widen to 6 lanes from Interchange 30 to Interchange 63; Improvements to the Bass River and Mullica River crossings | Burlington | 2014-2017 | \$ 540.0 |
| G | Atlantic City Expressway | Widen to 6 lanes from Route 73 to Atlantic County | Camden | 2014-2017 | \$ 150.0 |
| H | Atlantic City Expressway | All electronic tolling | Camden, Gloucester | 2014-2017 | \$ 50.0 |

SOURCE: DVRPC

CLOSING THE FUNDING GAP

Current federal, state, and local 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 over \$64 billion between the Vision Plan and the Funded Plan over the 27-year life of *Connections 2040*. Failure to maintain and improve the transportation system reduces the region's economic competitiveness, as it becomes a less attractive location for

business investment; the environment is degraded due to increased congestion; more vehicular damage is caused due to poor road conditions; and vehicular crashes increase due to less-safe driving conditions.

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. Local funding for transportation capital projects in the region remain well below peer region averages. This restricts Greater Philadelphia's ability to fulfill the Vision Plan and puts the region at a competitive disadvantage when compared to its peers across the nation and around the world.

The region does not have the power to control the level of federal or state funding that it receives. Given the large set of needs that will remain unmet at currently available funding levels, the region needs to seek ways to close



INNOVATION

RUTGERS CAIT BRIDGE INSPECTION ROBOT

It may come as a surprise that bridge inspections create one of the greatest opportunities for innovation and cost savings. Current inspections require a team of engineers and technicians several hours to perform, and the results come largely from their visual analysis. The Rutgers Center for Advanced Infrastructure and Transportation (CAIT) has developed a robot that can perform a much more detailed bridge inspection in a fraction of the time that it currently takes. Bridge inspections often require lane, or even full bridge, closures, tying up traffic in the process. By shortening inspection time, congestion is reduced.

Not only are the time savings substantial, but the data collected is much more detailed and informative about the bridge's actual condition. By using ground penetrating radar, the CAIT robot is able to quantitatively assess internal bridge deck conditions that currently can only be determined with practices that further degrade bridge quality and have safety risks (such as loading the bridge with heavy amounts of weight to test whether it can handle design loads). With a better understanding of bridge conditions, projects that can extend bridge lifespan can be more accurately timed, maximizing our public investments.

its funding gap. This can be through project right-sizing, better program management, and innovative project delivery on the expenditure side, and raising additional revenues, with a focus on local funding options or public-private partnerships on the revenue side.

Project Right-Sizing

Right-sizing and seeking efficiencies throughout the transportation system are a key component of the ongoing “smart transportation” programs 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 implementable 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.

Local Funding Options

Additional funding is needed if the region wants to realize the transportation vision set forth in this Plan. New funds will most likely need to be generated at all levels,

including locally. To do this, the region needs to find ways to translate the growth in its economic vitality into improvements in the transportation system. Options could include bonds, dedicating taxes or fees to transportation programs, or new or increased tolls. 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, should further the policies of the Plan, and not yield unintended negative economic impacts.

Most of these funding 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 three major categories: bonds and other financing programs; taxes and fees; and public-private partnerships.

Many economists and transportation experts recognize that congestion pricing can be

used for travel demand management and to increase system efficiency. In many ways they are similar to or dependent upon tolling.

BONDS

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. When inflation is rising faster than construction costs, issuing bonds can speed up project development and reduce expenses. Smart transportation investments can generate positive economic returns through increased efficiency. This should increase general revenues, which can help to pay off bonds. While bonds are a useful tool for financing projects, they are not a source of revenue, and there still needs to be a mechanism that can eventually retire them.

From 2008 to 2010, Pennsylvania floated \$600 million in bonds to fund repairs on more than 1,100 bridges. This represented a change in philosophy, as the commonwealth had long relied exclusively on pay-as-you-go funding for transportation improvements following a bond related debt crisis in the 1970s. The New Jersey Transportation Trust Authority (NJTTA) is holding \$13.4 billion in outstanding transportation bonds, and a total

of \$27.4 billion in outstanding debt. Annual service on this debt amounts to roughly the same amount that is collected every year in state gas tax receipts.

TRANSPORTATION INFRASTRUCTURE FINANCE AND INNOVATION ACT (TIFIA)

The current federal transportation bill, MAP-21, expanded funding for the TIFIA program to \$750 million in FY 2013 and \$1 billion in FY 2014. This program provides supplemental or subordinate financing for surface transportation projects (highway, transit, intercity passenger rail, some freight rail, and intermodal freight transfer facilities). This funding can offer a line of credit to a public or private project sponsor of up to 33 percent of the total project cost; a loan of up to 49 percent of the project cost; or a combination of a loan and a line of credit. The maximum TIFIA loan amount is \$50 million for most types of projects.

STATE INFRASTRUCTURE BANKS

The Pennsylvania Infrastructure Bank (PIB) provides low-interest loans to help fund transportation projects in the commonwealth. Eligibility for these loans extends to: local governments, transportation authorities, economic development agencies, nonprofits, and corporations. The PIB can loan up to \$30 million per year and has funded aviation,

roadway, rail freight, and transit capital projects. Upper Merion Township recently received a \$3.5 million PIB loan to fund the widening of Henderson Road.

The PIB helps to break large transportation project expenditures down into more affordable chunks, with up to a 10-year repayment period. However, like bonds and other alternative financing options, the PIB helps to advance project delivery and leverage state and federal funds, but is not a funding source on its own. New Jersey does not currently have a state infrastructure bank, but a recent proposal to create one appears to be moving in the New Jersey legislature.

TAXES AND FEES

DVRPC has reviewed more than two dozen potential different taxes or fees for applicability to fund the region's transportation system as part of the ongoing discussion of how to increase revenue. *Connections 2040* turns the focus to direct user fees, which are widely considered to be the fairest way to pay for system improvements. These fees are related to the use of the transportation system and can include vehicle miles traveled fees, tolling, gas taxes, or transit fares, amongst others.

Tolling options include existing 'free' highways and adding regional toll surcharges to facilities

that are already tolled. Congestion-based pricing varies the cost of using a road by time of day to reduce peak-period demand. This is considered the best way to reduce congestion. Adding tolls to interstate highways would require federal government approval, which is unlikely under current regulations. To be equitable, the cost 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.

PUBLIC-PRIVATE PARTNERSHIPS

Public-private partnerships (PPPs) are a way to have the private sector implement one or more portions of project delivery, from design, to build, finance, maintain, or even operate. These arrangements allow some of the risk to be undertaken by the private sector, in return for the opportunity for financial gain. PPPs generally do not create new revenues for transportation, but allow for streamlined project delivery, innovative financing approaches, and leveraging of public sector funds. Private investments in infrastructure will still need to be repaid, whether through direct tolling or lease agreements that use transportation trust fund or general fund revenues.

TABLE 17: REGIONAL USER FEES SUMMARY

| FUNDING OPTION | PROPOSED RATE | % INCREASE* | ANNUAL REVENUE (MILLIONS IN 2012 \$) | IMPACTS |
|----------------------------|--|-------------------------------------|---|--|
| Carbon Tax | \$15 per ton of transportation generated CO ₂ | 1.3% | \$ 350.0 | Likely to increase use of alternative fuel or energy efficient vehicles, and may encourage alternative modes of transportation |
| Congestion Pricing | (a) Cordon line - \$5 per car per day entering Center City Cordon Line (Callowhill St. to South St. and Schuylkill River to Delaware River) (b) Interstate Highways - Average 20 cents per mile during peak period | (a) 25.0% (b) 36.0% | (a) \$ 110.0 (b) \$ 660.0 | (a) May have negative impacts on Center City, but this area of the region has the most transportation options; high administration costs (b) Option with most congestion reduction; high administration costs |
| Fuel Sales Tax | 6.0% of consumer price | 2.0% | \$ 420.0 | Likely to increase use of alternative fuel or energy efficient vehicles, and may encourage alternative modes of transportation |
| Regional Toll Surcharge | (a) \$1.00 surcharge on 12 regional turnpike exits (b) \$1.00 surcharge on 9 toll bridges over Delaware River | (a) 18.7% - 23.7% (b) 20% - 100% | (a) \$ 100.0 (b) \$ 100.0 | Many trips lack transportation alternatives |
| Sales Tax | Increase existing rate by 0.25 percent | 0.25% | \$ 170.0 | Little impact on transportation system use and development patterns |
| Toll Existing Highways | \$0.10 (avg.) per VMT on major regional highways | 18.7% | \$ 560.0 | May shift traffic onto local roads, high administration costs; may encourage transit use |
| Transit Fare Increases | Increase all fares by 1 percent | 1% | \$ 1.5 | May reduce transit ridership and increase VMT |
| Vehicle Miles Traveled Fee | \$0.01 per mile | 1.8% | \$ 380.0 | Likely the largest decline in VMT |
| Vehicle Registration Fee | Increase \$10 per vehicle | 0.2% | \$ 33.0 | Very little impact on transportation system use and development patterns |

SOURCE: DVRPC

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* Percent increase determined by comparing per-mile cost to \$0.555 federal reimbursement rate for all fees, except: cordon line toll (average cost of vehicle trip to Center City); regional toll surcharge (average toll paid); sales tax (increase in cost of goods and services); transit fares (existing fares); and vehicle registration fees (average annual auto costs).



Pennsylvania formally legalized PPPs in Act 88 of 2012. This Act created a Public Private Transportation Partnership Board to approve potential PPP projects. Regional public entities such as PennDOT, the Pennsylvania Turnpike, and SEPTA can solicit a Request for Proposal (RFP) through this board. Responses to the RFP go to the board, which then selects the private respondent whose proposal offers the highest value and meets the best interests of the commonwealth and its residents.

Projects can be to build new facilities or improve the capacity or performance of existing facilities.

New Jersey does not currently have state-enabling legislation for transportation PPPs. Although the River LINE was designed and built, and is still operated and maintained by a private entity.

Time for Action

The transportation investments outlined in *Connections 2040* 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 80 percent of projected available funding will be allocated to rebuild the roadway and transit system. By focusing growth and development in Centers, the region will have less demand for new roadway facilities. This will reduce the amount of infrastructure needed to be maintained in the future.

Placing development near existing transit routes will help increase ridership. This will improve the operating cost recovery of our transit system, making it more self-sufficient on the operating side, and allow for more capital funding for system improvements.

Transit, bicycle, and pedestrian projects reflect a significant funding commitment 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 roadway capacity funding is capped at five percent of total

anticipated highway revenue. This funding structure follows the prioritization of needs for both the roadway and transit systems that were outlined as strategic policies.

The *Connections 2040* Plan creates a vision of a more sustainable region. Modernizing transportation infrastructure is a major component to achieving sustainability, and more funding is needed to make the vision a reality. Transportation infrastructure shapes land use, impacts the environment, and affects our global competitiveness.

The Plan's vision 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 transportation alternatives. Drivers will benefit from the provision of better information, improved safety, and reduced congestion. 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 CO₂ emissions, attracting skilled workers, and providing for a high quality of life.

To achieve this vision, we all need to make the choices that support it. Locating households and businesses in Centers, using alternative transportation, and supporting funding options to pay for the transportation improvements are all needed to make the Plan a reality. The Plan continues the dialogue and consensus building on finding the optimal funding solutions. It is likely that a combination of several funding mechanisms, with help from all levels of government, is needed in order to fully fund the region's identified needs.

The region's local funding contribution is low compared to other large metropolitan areas, and additional funding needs to be raised here in Greater Philadelphia if we want to remain competitive with other regions and nations. This will be even more imperative if, as expected, federal transportation funding continues to decline. This Plan issues 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 improves our standard of living, economic competitiveness, and sustainability.



PHOTO: PENNSYLVANIA HORTICULTURAL SOCIETY (PHS)

06 | TAKING ACTION

Connections 2040 serves as a blueprint for future development and investment. Achieving the goals in the Plan will require a concerted, coordinated effort among elected officials, the business community, advocacy groups, and the citizenry.

DVRPC COORDINATION EFFORTS

DVRPC acts as a regional facilitator, bringing together various, sometimes disparate, stakeholders in forums to address critical issues and work toward achieving the Plan’s vision for the future. Much of the coordination and outreach is conducted through DVRPC’s various committees. Some of the key committees facilitated by DVRPC include:

The Public Participation Task Force provides citizen access to, and participation in, the regional planning and decision-making process.

The Regional Community and Economic Development Forum provides a regional forum for land use, housing, and economic development issues facing Greater Philadelphia. This committee also serves in a technical review capacity for the regional Comprehensive Economic Development Strategy.

The Planning at the Edge Forum attends to interregional issues and projects and provides outreach to adjacent metropolitan planning organizations and counties with the goal of achieving cooperative solutions.

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 helps 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.

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.

The Regional Aviation Committee

provides technical and policy guidance concerning regional airport systems planning to the Federal Aviation Administration, the states, and the DVRPC.

The Central Jersey Transportation Forum

addresses 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 key issues it addresses are east-west access; improving coordination of transportation and land use in this high growth, congested area; and transit.

Strategies for Older Suburbs Roundtable

Group brings municipal officials, Business Improvement District and Main Street managers, and related partners together to discuss issues and exchange ideas on revitalizing communities. Outside experts are brought in to share their knowledge, and discussions are facilitated so that participants also ask questions and share solutions with one another.

The Urban Waterfront Action Group

(UWAG) was created to provide “one-stop” shopping for information about waterfront development permits along the Pennsylvania side of the Delaware River. The UWAG provides a prepermit application service, whereby potential waterfront developers and regulatory agencies can meet to identify and work to resolve potential permitting issues.

The Information Resources Exchange

Group (IREG) provides 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.

DVRPC PROGRAM AND PROJECT EFFORTS

The long-range plan serves as the key policy directive for DVRPC. The programs and projects in DVRPC’s work program serve to promote and carry out the goals of the Plan. The following examples highlight some of the ways that DVRPC is implementing *Connections 2040*.

Transportation and Community Development

Initiative (TCDI) provides grants to support local development and redevelopment efforts in the region’s Core Cities and Developed Communities. Since 2002, DVRPC has provided over \$12.6 million (\$4.95 million in NJ, and \$7.7 million in PA) in TCDI funding, which has leveraged over \$332 million in public and private funding. Leveraged dollars included additional planning, engineering, and construction activities.

Municipal Implementation Tools

are a series of brochures specifically written for busy municipal officials and staff that want an introductory overview on topical issues. Twenty-five brochures are published to date, covering topics such as shared services,

noncontiguous parcel clustering, zoning for wireless service facilities, and energy efficient traffic signals and streetlights.

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. This competitive program includes 18 designated Classic Towns that financially contribute to a pool of funding collectively used for marketing the Classic Towns and enhancing their staffs’ skills. Marketing includes a promotional video, website, and events, such as a Classic Towns photo contest and traveling show. Targeted professional development bolsters skills in public relations, marketing, using social media, and engaging local businesses.

The Mobility Alternatives Program (MAP) helps companies improve their benefits package, helps employees save time and money on their commute, and helps reduce traffic and air pollution in the region. MAP has information on transportation alternatives, including transit, carpooling, vanpools, and even working from home, and how companies and individuals can take advantage of them. In addition, there’s 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.

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

Air Quality Partnership is a public-private coalition of businesses and organizations that promote 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 personal health through a broad-based outreach effort.

TreeVitalize is a program launched 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. To directly reverse that loss, DVRPC has partnered with the Pennsylvania Horticultural Society (PHS)

to access funding from PENNVEST for tree planting projects that manage stormwater. To date, the DVRPC/PHS partnership has received funding awards from PENNVEST to plant over 4,500 trees in communities across the region.

Incident Management Task Forces serve as the regional clearinghouse for incident management activities. DVRPC currently administers and supports seven corridor-based incident management task forces (IMTFs). The IMTFs facilitate communication and cooperation among organizations involved in responding to traffic incidents with the goals of improving responder safety, incident clearance, and minimizing impacts on traffic operations.

The Regional Trails Program, administered by DVRPC, with funding from the William Penn Foundation, aims to capitalize upon opportunities for trail development by providing funding for targeted, priority trail design, construction and planning projects that will promote a truly connected, regional network of multi-use trails with Philadelphia and Camden as its hub. The program will also provide technical assistance to trail developers, counties, municipalities and nonprofit organizations.

WHAT YOU CAN DO

Your help is needed to fully implement the *Connections 2040* 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 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 trips shorter than two miles.
- ▶ Carpool, or link automobile trips together and travel during off-peak times.

- ▶ Use green driving techniques: avoid rapid acceleration and unnecessary braking, keep tires properly inflated, remove excess weight from your vehicle, maintain steady speeds, use cruise control and the highest gear, keep your engine tuned, and don't let your car idle for more than 30 seconds.
- ▶ Purchase LED or compact fluorescent light bulbs, energy-efficient appliances, and vehicles, and turn off lights and appliances when not in use.
- ▶ Make sure your home is properly insulated and turn your thermostat to 75° or higher in the summer months and 68° or lower in the winter months.
- ▶ Conduct an energy-efficiency audit on your home or business and consider renewable energy sources.
- ▶ Integrate sustainable business practices into your company's operations.
- ▶ 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 or grow a garden.
- ▶ Start or join a neighborhood composting program and recycle to reduce household waste.
- ▶ Reduce stormwater runoff and water use by planting native plants, installing rain barrels, and replacing pavement with pervious materials.
- ▶ Volunteer to help clean-up your street, local park, or open space.
- ▶ Take advantage of our region's extensive park and trail network by getting exercise and enjoying the outdoors.
- ▶ Support community-buiding, mixed-use developments when they are proposed in your neighborhood.
- ▶ Join us in shaping the future of our region by participating in public meetings, reviewing our website and publications, or submitting comments on our plans and programs.



GETTING THERE

Connections 2040 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 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.

As the region implements the *Connections 2040* Plan, it will be important to determine whether the goals contained in the Plan are being met. DVRPC will continue to compile a meaningful time-series data set that will help us assess how well we are doing. This, in turn, will help us prioritize attention where it is most effective and will inform future DVRPC activities, including subsequent long-range planning efforts.

ACRONYMS

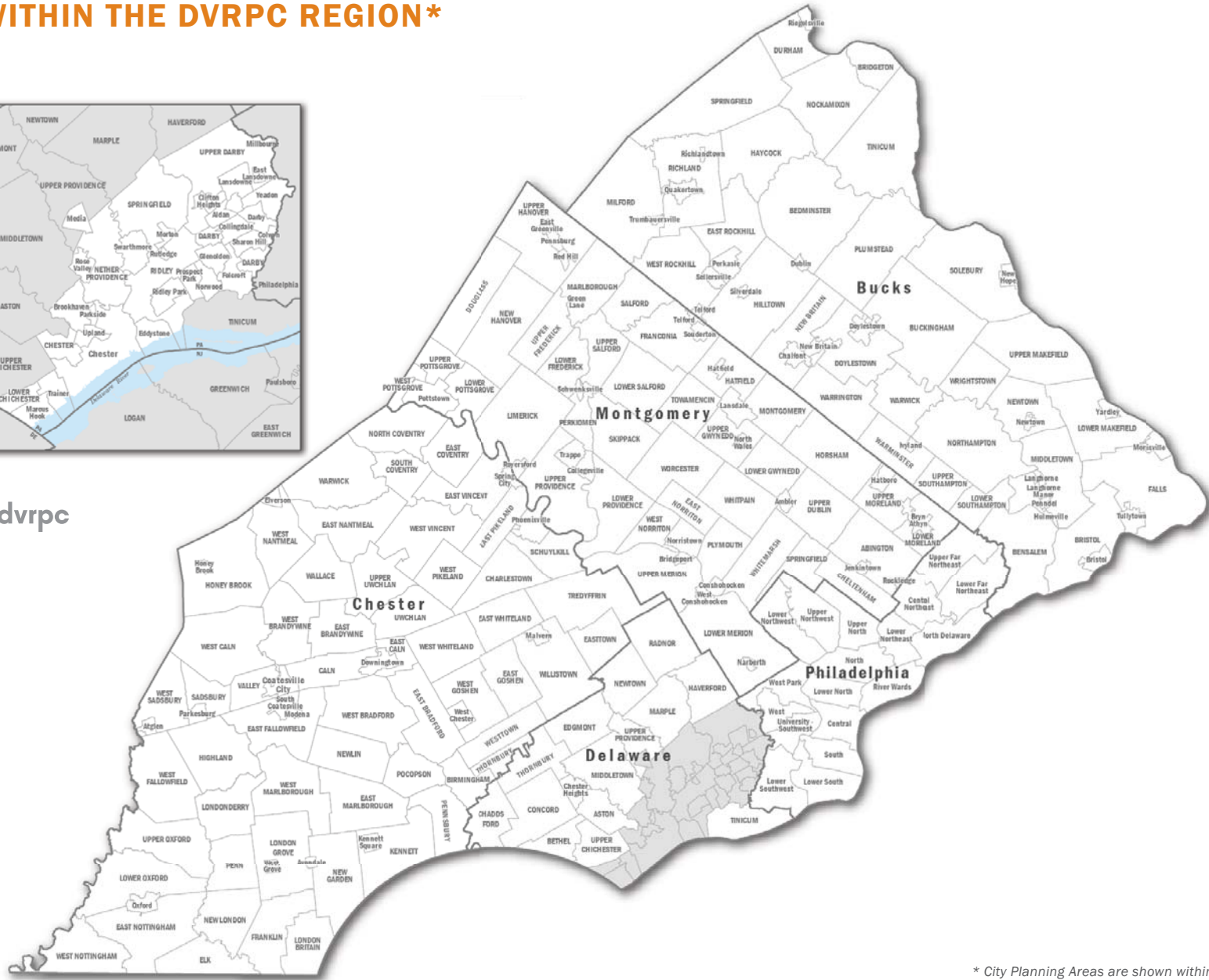
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|-----------------------|---|
| AADT | Average Annual Daily Traffic |
| ADA | Americans with Disabilities Act |
| AQP | Air Quality Partnership |
| ARRA | American Recovery and Reinvestment Act |
| AVL | Automatic Vehicle Location Systems |
| B/C | Benefit-Cost Ratio |
| BMS | Bridge Management System |
| BRT | Bus Rapid Transit |
| CAAA | Clean Air Act Amendments |
| CAIT | Center for Advanced Infrastructure and Transportation (Rutgers University) |
| CCTV | Closed Circuit Television Cameras |
| CEDS | Comprehensive Economic Development Strategy |
| CHSTP | Coordinated Human Services Transportation Plan |
| CJTF | Central Jersey Transportation Forum |
| CMAQ | Congestion Mitigation and Air Quality (Federal Funding) |
| CMP | Congestion Mitigation Process |
| CO | Carbon Monoxide |
| CO₂ | Carbon Dioxide |
| CPI | Consumer Price Index |
| CZM | Coastal Zone Management |
| DMS | Dynamic Message Sign |
| DOD | Degrees of Disadvantage (Environmental Justice) |
| DRJTBC | Delaware River Joint Toll Bridge Commission |
| DU | Dwelling Unit |
| DVGMTF | Delaware Valley Goods Movement Task Force (of DVRPC) |
| DVRPC | Delaware Valley Regional Planning Commission |
| EA | Environmental Assessment |
| EGGS | Efficient Growth for Growing Suburbs (of DVRPC) |
| EIS | Environmental Impact Study |
| EJ | Environmental Justice |
| EPA | Environmental Protection Agency |
| ESP | Emergency Service Patrol(s) |
| EV | Electric Vehicle |
| FAA | Federal Aviation Administration |

| | |
|---------------------------|---|
| FHWA | Federal Highway Administration |
| FRA | Federal Railroad Administration |
| FTA | Federal Transit Administration |
| FY | Fiscal Year (July 1 to June 30) |
| GA | General Aviation |
| GHG | Greenhouse Gases |
| GIS | Geographic Information System |
| HOT | High Occupancy Toll Lane |
| HOV | High-Occupancy Vehicle |
| HPMS | Highway Performance Monitoring System |
| IM | Incident Management |
| IMP | Interstate Management Program |
| IREG | Information Resources Exchange Group (of DVRPC) |
| ISTEA | Intermodal Surface Transportation Efficiency Act (1991 Federal Funding) |
| IT | Information Technology |
| ITS | Intelligent Transportation System |
| IVHS | Intelligent Vehicle Highway System |
| JARC | Job Access Reverse Commute |
| LOS | Level of Service |
| LPN | Linking Planning and NEPA |
| LRP | Long-Range Plan |
| MAP | Mobility Alternatives Program |
| MAP 21 | Moving Ahead for Progress in the 21st Century (Federal Transportation Funding) |
| MIT | Municipal Implementation Tool (of DVRPC) |
| MMTCO₂E | Million Metric Tons of Carbon Dioxide Equivalent (Air Quality) |
| MPO | Metropolitan Planning Organization |
| MSA | Metropolitan Statistical Area |
| MTCO₂E | Metric Tons of Carbon Dioxide Equivalent (Air Quality) |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NGV | Natural Gas Vehicle |
| NHPP | National Highway Performance Program (MAP-21 Federal Funding Program) |
| NHS | National Highway System (Highway Funding) |
| NJ DCA | New Jersey Department of Community Affairs |
| NJ OPA | New Jersey Office for Planning Advocacy |

| | |
|-------------------------|---|
| NJDEP | New Jersey Department of Environmental Protection |
| NJDOT | New Jersey Department of Transportation |
| NJT | New Jersey Transit |
| NLT | Natural Lands Trust |
| NOx | Oxides of Nitrogen (Air Quality) |
| O₃ | Ozone (Air Quality) |
| P3 | Public Private Partnership (also called “3P”) |
| PA DCED | Pennsylvania Department of Community and Economic Development |
| PADCNR | Pennsylvania Department of Conservation and Natural Resources |
| PADEP | Pennsylvania Department of Environmental Protection |
| PADOT | Pennsylvania Department of Transportation (“PennDOT”) |
| PART | Pottstown Area Rapid Transit |
| PATCO | Port Authority Transit Corporation |
| PATE | Planning at the Edge Advisory Committee (of DVRPC) |
| PEC | Pennsylvania Environmental Council |
| PENNDOT | Pennsylvania Department of Transportation |
| PHL | Philadelphia International Airport |
| PM_{2.5} | Particulate Matter finer than 2.5 micrometers (Air Quality) |
| PMS | Pavement Management System |
| PPI | Producer Price Index |
| PPP | Public Private Partnership (“P3” or “3P”) |
| PPTF | Public Participation Task Force (of DVRPC) |
| PTC | Pennsylvania Turnpike Commission |
| RAC | Regional Aviation Committee (of DVRPC) |
| RASP | Regional Aviation Systems Plan |
| RFP | Request for Proposals |
| RIMIS | Regional Integrated Multimodal Information Sharing Project |
| RMS | Roadway Management System |
| ROW | Right of Way |
| RSTF | Regional Safety Task Force |
| RTC | Regional Technical Committee (of DVRPC) |
| SAFETEA- LU | Safe, Accountable, Flexible Efficient Transportation Equity Act: A Legacy for Users (2005 Federal Funding) |
| SAR | Share-A-Ride |
| SDRP | State Development and Redevelopment Plan (New Jersey) |
| SEPTA | Southeastern Pennsylvania Transportation Authority |
| SGR | State-of-Good Repair |
| SHSP | Strategic Highway Safety Plan |

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|---------------|--|
| SIP | State Implementation Plan (Air Quality) |
| SOV | Single-Occupant Vehicle |
| STIP | State Transportation Improvement Program |
| STP | Surface Transportation Program (Highway Funding) |
| TA | Transportation Alternative |
| TAZ | Traffic Analysis Zone |
| TCDI | Transportation Community Development Initiative (of DVRPC) |
| TCM | Transportation Control Measures |
| TDM | Transportation Demand Management |
| TDR | Transfer of Development Rights |
| TE | Transportation Enhancements |
| TEA-21 | Transportation Equity Act for the 21st Century (1998 Federal Funding) |
| TFAC | Transportation Funding Advisory Commission (Commonwealth of Pennsylvania) |
| TIF | Tax-Increment Financing |
| TIGER | Transportation Investment Generating Economic Recovery |
| TIP | Transportation Improvement Program |
| TMA | Transportation Management Association |
| TND | Traditional Neighborhood Development |
| TOC | Transportation Operations Center |
| TOD | Transit-Oriented Development |
| TRID | Transit Revitalization Investment District |
| TRO | Trip Reduction Ordinance |
| TSM | Transportation System Management (ITS) |
| TTI | Travel Time Index |
| UPWP | Unified Planning Work Program (of DVRPC) |
| USDOT | United States Department of Transportation |
| USEDA | United States Economic Development Administration |
| USEPA | United States Environmental Protection Agency |
| UWAG | Urban Waterfront Action Group |
| V/C | Volume to Capacity Ratio |
| VMS | Variable Message Sign |
| VMT | Vehicle Miles Traveled (by all vehicles in a specific geographic area over a given period of time.) |
| VOC | Volatile Organic Compounds (Air Quality) |
| YOE | Year of Expenditure |

PENNSYLVANIA MUNICIPALITIES WITHIN THE DVRPC REGION*



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* City Planning Areas are shown within Philadelphia

NEW JERSEY MUNICIPALITIES WITHIN THE DVRPC REGION



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CONNECTIONS 2040

PLAN FOR GREATER PHILADELPHIA



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GEOGRAPHIC AREA COVERED: *The nine-county DVRPC region, which covers the counties of Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania, and Burlington, Camden, Gloucester, and Mercer counties in New Jersey.*

KEY WORDS: *Long-Range Plan, Greater Philadelphia, regional policy, core planning principles, sustainability, equity, innovation, financial plan, transportation needs, trends, forecasts, vision, future, funding gap, funding options, multimodal, growth management, livable communities, economy, land use, centers, technology, major regional projects, MPO, implementation, natural resource protection, open space preservation, transportation*

ABSTRACT:

Connections 2040 Plan for Greater Philadelphia is the Long-Range Plan for the Greater Philadelphia region. It assesses regional trends and forecasts and sets forth a vision for the future. The Plan is organized around four core principle to achieve the vision: Manage Growth and Protect the Environment, Create Livable Communities, Build the Economy, and Establish a Modern Multimodal Transportation System. The Plan includes goals and strategies under each of the four core principles. It also identifies a set of investments in the region's transportation system that are needed to preserve and maintain the existing system, as well as other critical improvements that make the system operate more efficiently and expand capacity. Due to declining funding revenues, only a portion of these investments can be afforded. The Plan prioritizes investments, based on quantitative analysis, and presents an overview of alternatives to address the funding shortfall.

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