PLAN 2045

Connecting North Jersey

NJTPA REGIONAL TRANSPORTATION PLAN

NJTPA NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

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November 2017

NJTPA NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

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Foreword from the NJTPA Chair and Executive Director

WE ARE PLEASED TO PRESENT *Plan 2045: Connecting North Jersey* on behalf of the North Jersey Transportation Planning Authority (NJTPA) Board of Trustees.

In these pages, you'll learn much about the vital role transportation plays in the life and economy of our region, where 6.7 million people live, work and play. You'll read about the trends shaping the future of transportation—such as our continued population and job growth; our rebound from the Great Recession; the shift of economic development and redevelopment to areas with good walking, biking and transit options; and the burgeoning freight sector that is contributing to our regional economy. You'll also get insight into future challenges, such as the potentially transformative impact of new technologies.

NJTPA Chair and Union County Freeholder Angel Estrada and NJTPA Executive Director Mary K. Murphy

This plan features NJTPA's long-range vision for maintaining our current transportation system while making investments to improve mobility in our region's diverse urban, suburban and rural settings. It draws inspiration from and seeks to advance the goals of the 2015 Together North Jersey plan, which linked transportation to broader aspects of community development.

Most importantly, this is a plan shaped by the residents of our region. The NJTPA thanks the thousands of people who offered input during plan development. We look forward to your continued involvement as we go about the important work of turning this plan into reality for the benefit of everyone in our region.

Angel Estrada
NJTPA Chair
Union County Freeholder

Mary K. Murphy
NJTPA Executive Director

The NJTPA and Its Region

The North Jersey Transportation Planning Authority (NJTPA) is the federally authorized Metropolitan Planning Organization (MPO) for the 13-county northern New Jersey region. The federal government requires each urbanized region of the county to establish an MPO to provide local guidance over the use of federal transportation funding and ensure it is spent cost-effectively to improve mobility, support economic progress and safeguard the environment.

The NJTPA oversees over $2 billion in transportation investments each year. It analyzes transportation needs, approves proposed projects and provides a forum for interagency cooperation and public input into funding decisions. It also sponsors and conducts studies, assists county planning agencies and monitors compliance with national air quality goals.

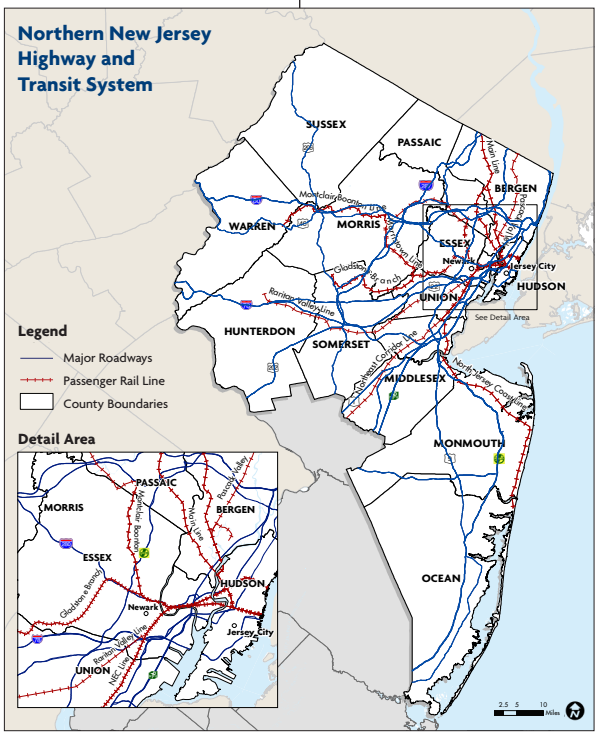
The NJTPA Board consists of one elected official from each of the region's 13 counties; Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren, and its two largest cities, Newark and Jersey City. The Board also includes a Governor's Representative, the Commissioner of the New Jersey Department of Transportation (NJDOT), the Executive Director of NJ TRANSIT, the Deputy Executive Director of the Port Authority of NY & NJ, and a Citizens' Representative appointed by the Governor.

NJTPA Board meetings are held bi-monthly, open to the public, and streamed live via the NJTPA website. The meeting schedule can be found at www.njtpa.org.

The NJTPA Region

The NJTPA serves the fourth most populous MPO region in the nation with over 6.7 million people and over 3.1 million payroll jobs. The 13-county region covers 4,200 square miles, half of the state's land area, and includes 384 municipalities. Key features of the regional transportation system serving the region include the following:

- The region is home to 26,000 miles of roads: 2,300 state, 3,700 county, and 20,000 municipal.
- NJ Transit provides some 250 local and express bus routes throughout the region.
- NJ Transit's rail system in the region includes: 10 commuter rail lines with 150 stations and 390 miles of track and 2 light rail lines with 41 stations and 23 miles of track.
- Amtrak provides intercity service from the Newark Penn Station, Newark International Airport, Metropark, and New Brunswick stations on the Northeast Corridor.
- The 14-mile PATH commuter rail service connects Newark, Harrison, Hoboken, and Jersey City with Lower and Midtown Manhattan.
- There are nearly 4,900 bridges in the region.
- Three ferry companies operate 18 routes between New Jersey and New York City from 19 piers.
- The region is home to the largest seaport on the East Coast, which also is the third largest in the US and the twenty-fifth largest in the world.
- The region is also home to Newark Liberty International Airport, which handled over 33 million passengers and nearly 700,000 tons of air cargo in 2015.
- The region has an extensive trucking industry that handles at least 400 million tons traveling by truck, or almost 80% of the 508 million tons traveling through the NJTPA region each year.



Source: NJOIT, 2008; NJ TRANSIT, 2016; NJDOT, 2014; Esri, 2016

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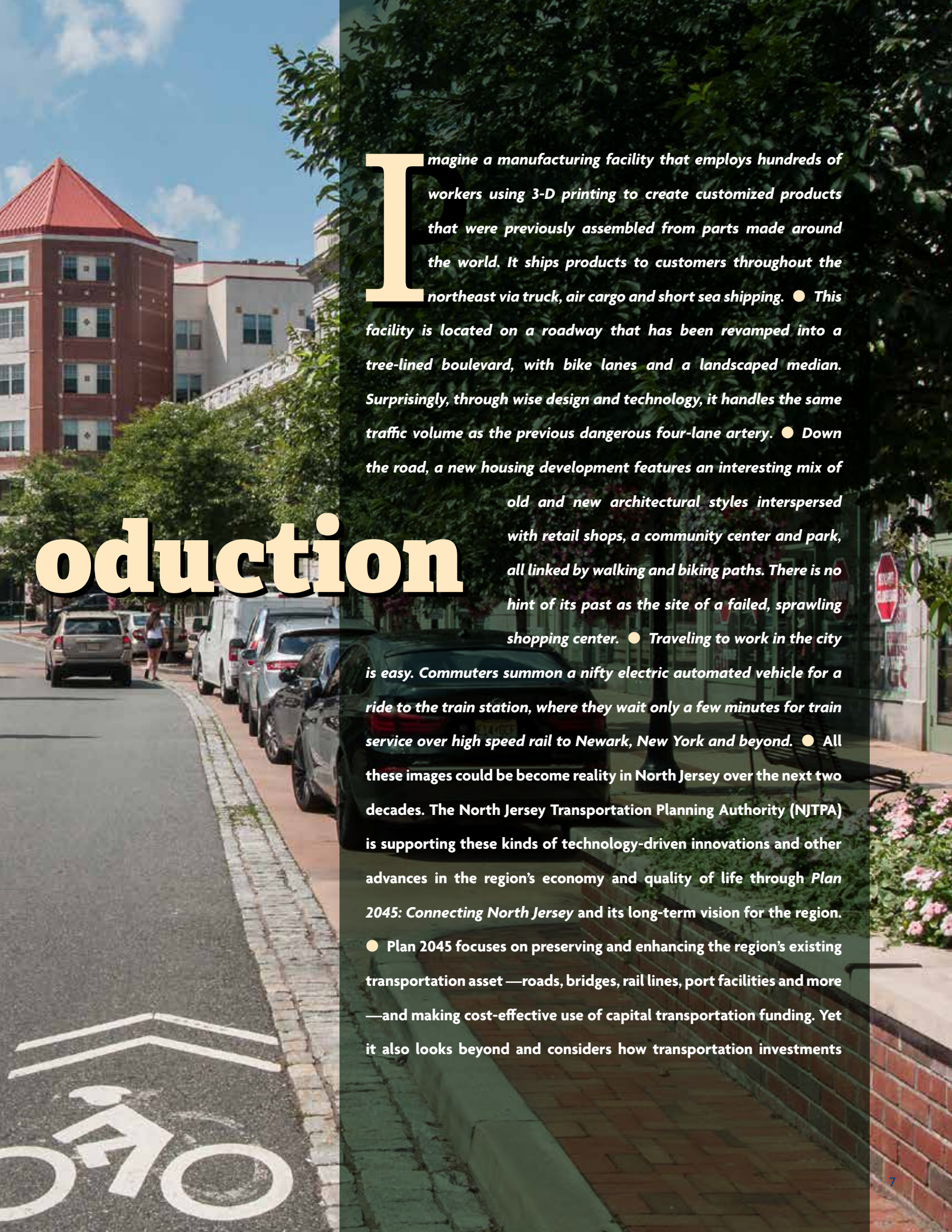
Montclair, Essex County



oduction

Imagine a manufacturing facility that employs hundreds of workers using 3-D printing to create customized products that were previously assembled from parts made around the world. It ships products to customers throughout the northeast via truck, air cargo and short sea shipping. ● *This facility is located on a roadway that has been revamped into a tree-lined boulevard, with bike lanes and a landscaped median. Surprisingly, through wise design and technology, it handles the same traffic volume as the previous dangerous four-lane artery.* ● *Down the road, a new housing development features an interesting mix of old and new architectural styles interspersed with retail shops, a community center and park, all linked by walking and biking paths. There is no hint of its past as the site of a failed, sprawling shopping center.* ● *Traveling to work in the city is easy. Commuters summon a nifty electric automated vehicle for a ride to the train station, where they wait only a few minutes for train service over high speed rail to Newark, New York and beyond.* ● **All these images could be become reality in North Jersey over the next two decades. The North Jersey Transportation Planning Authority (NJTPA) is supporting these kinds of technology-driven innovations and other advances in the region's economy and quality of life through *Plan 2045: Connecting North Jersey* and its long-term vision for the region.** ● **Plan 2045 focuses on preserving and enhancing the region's existing transportation asset —roads, bridges, rail lines, port facilities and more —and making cost-effective use of capital transportation funding. Yet it also looks beyond and considers how transportation investments**

Jersey City, Hudson County

Plan 2045 Goals

- Protect and improve natural ecosystems, the built environment and quality of life.
- Provide affordable, accessible and dynamic transportation systems responsive to all current and future travelers.
- Retain and increase economic activity and competitiveness.
- Enhance system coordination, efficiency, overall safety and connectivity for people and goods across all modes of travel.
- Maintain a safe, secure and reliable transportation system in a state of good repair.
- Create great places through select transportation investments that support the coordination of land use with transportation systems.
- Improve overall system safety, reducing serious injuries and fatalities for all travelers on all modes.

can promote broader regional objectives. In particular, over the next 25 years, it seeks to make the region more competitive, efficient, livable and resilient. These are the four themes that emerged from Together North Jersey, an extraordinary region wide planning effort launched in 2013, in which the NJTPA plays an ongoing leadership role.

Together North Jersey

With support from a federal grant, Together North Jersey brought together a coalition of more than 100 diverse partners—non-profits, government agencies, educational institutions, businesses, elected officials, community activists and others—to develop strategies to improve lives and opportunities for North Jersey residents and businesses. The NJTPA joined with Rutgers, the State University of New Jersey, and NJ TRANSIT in leading the organization.

A driving force behind the Together North Jersey planning process was "Connecting People, Places and Potential," an idea that speaks directly to the importance of transportation and the concept of "Connecting North Jersey." The plan, finalized in 2015 following extensive input from the public during three rounds of outreach, contains a host of recommendations organized around the four themes of making the region more **competitive**, **efficient**, **livable** and **resilient**, (see Together North Jersey p. 14). The recommendations range widely, touching upon health and safety, natural systems, housing, education, workforce training, job access, arts, culture, business, industry, economic development, energy and climate change. The plan recognizes that transportation and land use decisions are cross-cutting issues, affecting and being affected by nearly all other areas of concern.

Plan 2045: Connecting North Jersey draws insights and guidance from the Together North Jersey plan and helps to implement its recommendations by shaping the transportation system in ways that will support communities, families and individuals across an array of issues, beyond just mobility. The NJTPA is also continuing to work with its Together North Jersey partners through four task forces focused on each theme. These efforts often involve work to encourage new approaches to land use, such as promoting development around rail stations or creating improved access to areas targeted for redevelopment. Plan 2045 uses graphics in Chapter 5—Needs, Strategies and Implementation to highlight the connections between transportation and the four themes.

Plan Update

While involvement in Together North Jersey has broadened the planning horizons of NJTPA and its partner agencies, this plan remains grounded

in NJTPA's responsibilities as the region's federally authorized Metropolitan Planning Organization (MPO). Federal law requires the NJTPA to update its long-range Regional Transportation Plan (RTP) every four years in order for the region to continue receiving federal transportation funding. Only projects and needs identified in the RTP are eligible to make use of this funding.

Plan 2045: Connecting North Jersey updates the long-range plan the NJTPA Board approved in September 2013. Over the last four years, many challenges affecting transportation in the region have persisted, such as the need to address aging infrastructure, ease recurring congestion in many locations and make progress towards building much needed new rail tunnels under the Hudson River. However, as discussed further in Chapter 3—Context & Trends and elsewhere in this plan, this updated plan also considers new and emerging developments, including the following:

- Since 2013, the regional economy has rebounded, regaining jobs lost during the recession of 2007-2009
- The latest forecasts estimate that the region's population will increase by 17 percent, from 6.7 million to 7.7 million people by 2045; employment will increase by 13 percent, from 3 million to 3.4 million jobs
- From 2010 to 2015, miles of vehicle travel have increased 3 percent largely due to lower gas prices, boosting economic activity but also likely adding to crashes
- Less driving by young people, who are getting drivers licenses later or not at all, portends long-term need for transit and mobility alternatives

Bridgewater, Somerset County

- Growth of single person households and preferences among young people and older adults for housing in walkable areas is challenging traditional suburban land use patterns
- Smartphones, real-time data and other technologies are changing how transportation is provided and managed. Self-driving cars and other innovations could be transformative.

Plan Guidance

In April 2016, the NJTPA Board of Trustees met at a retreat to discuss these and other issues, a key point in the development of Plan 2045. The Board, reviewing current trends and issues, endorsed changes to the goals that have long guided the agency's planning, including long-range plan updates. The goals (see p. 8) were modified to include creating "great places" in recognition of the need to strengthen the connection between transportation and land use development.

The Trustees also added a new safety goal, reflecting the growing importance of safety in NJTPA planning. This includes the agency's successful Street Smart NJ pedestrian safety education campaign across the state (see Street Smart NJ p. 95). Street Smart NJ complements NJTPA's traditional focus on safety-related capital projects.

Regarding long-term regional investments, the Board concluded that the region's top priority must continue to be maintaining and preserving existing infrastructure. The second highest priority identified was enhancing and expanding transit. These priorities are reflected in the financial plan (see Chapter 6).

While Plan 2045 was under development, new federal regulations and legislation provided additional guidance. In December 2015, the Fixing America's Surface Transportation (FAST) Act was signed into law. It expands the scope of MPO planning to include greater consideration of resiliency and reliability, storm water impacts and enhancing travel and tourism. These and other federal planning factors (see Federal Planning Factors p. 11) have guided this plan's development. The FAST Act also carried forward from previous legislation new requirements for using performance measures to improve accountability of project impacts. In response, the NJTPA has been working with its partners to further enhance its performance-based planning, as discussed in Chapter 7—Moving Forward.

State legislation has also shaped Plan 2045. In October 2016, the Governor signed into law a renewal

of the state Transportation Trust Fund, providing $16 billion over eight years for transportation in the state. Plan 2045 takes this increased funding into account in its examinations of scenario testing (Chapter 4) and financing (Chapter 6).

Public Outreach

The NJTPA recognizes that its plans and programs must be responsive to the public and attuned to the region's ever-evolving conditions and needs. To gather input and give this plan a reality check, the NJTPA conducted extensive outreach to the public and regional stakeholders as described in Chapter 2. This outreach, which engaged nearly 3,000 residents and stakeholders included meetings, online surveys, booths at festivals and events and a variety of innovative methods. The survey asked residents questions relating to seven topics: Great Places, Safety, Resiliency, Getting Around, Technology, Environment and Economy.

People who participated in the outreach called for expanding public transit, whether that meant creating new service or building on existing service by offering more night and weekend trips, better connections and more frequent service. Survey participants expressed safety concerns about distracted driving, bicycling and walking. And they said walking and biking could be more viable transportation options, by creating more bicycle lanes, improving sidewalks and making roads safer for pedestrians.

Participants also called for road, bridge and other infrastructure improvements, noting they would make travel safer and also make communities more resilient to severe weather events. Many people said that such infrastructure improvements would also help to boost the economy. When it comes to technology, people said they are most excited about driverless and electric vehicles, and transit ticketing and informational applications. They said that investment in education and research institutions, as well as public-private partnerships could help further the advancement of these technologies.

Scenarios and Investment Priorities

Computer modeling also played a role in plan development. It was used to explore a number of possible future scenarios to address the inherent uncertainties involved in assessing future trends and conditions and the long-term impact of investments.

As presented in Chapter 4, the results of modeling and technical analysis along with input from the public and experts was used to update the NJTPA's Regional Capital Investment Strategy (RCIS), a statement of principles and guidelines, along with desired spending allocations for different types of transportation projects. The allocation objectives are not intended to dictate year-to-year spending, but to provide a general guide over the life of Plan 2045. To monitor the effectiveness of the RCIS, the NJTPA uses performance measures to assess impacts of investments and to set targets for how well the transportation system functions and is maintained.

Needs, Strategies, Funding

Chapter 5 sets out the NJTPA's vision for how transportation needs across all modes and facilities can be addressed over the next 25 years—including highways, local roads, bus and rail lines and bridges. Throughout the discussion are assessments of the impacts of system improvement strategies and projects on the region's economy.

While preserving existing infrastructure is the plan's highest priority, it also calls for strategic improvements that will address bottlenecks and other problems while allowing road and transit systems to

Iselin, Middlesex County

handle rising levels of travel demand—creating new and better connections for people and goods. These improvements range from new Hudson River rail tunnels (as part of a larger Gateway program) to new modern roundabouts to more sidewalks and bike lanes in revitalized downtowns.

The plan pays special attention to new technologies that can make the transportation system work more efficiently, often with modest capital outlays. Many technologies are already being applied, including computerized traffic signal systems, smart phone apps for providing traveler information and systems to gather and use real-time roadway data. But, if experience is any guide, the next 25 years will also bring new, transformative technologies. Already on the horizon, as noted, is the advent of self-driving vehicles.

Federal Planning Factors

Under federal law, the planning process of MPOs including the NJTPA must be continuous, cooperative, and comprehensive, and provide for consideration and implementation of projects, strategies, and services that address the following factors:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation;
8. Emphasize the preservation of the existing transportation system;
9. Improve the resiliency and reliability of the transportation system and reduce or mitigate storm water impacts of surface transportation; and
10. Enhance travel and tourism.

Asbury Park, Monmouth County

Also coming into view are wider use of 3-D printing to produce goods closer to end users and artificial intelligence that could fundamentally change the nature of work and workplaces.

This plan seeks to build flexibility into projects and programs—including through careful study of alternatives and designs based on best practices and community needs—to allow the region to take advantage of these and other advances and accommodate changing travel patterns. It also seeks to make the system resilient in the face of disruption or disaster while continuing to safeguard the environment and improve air quality.

Paying for the plan remains a challenge. Despite increased federal and state funding, needs continue to far outstrip available resources. This makes prioritizing investments through the MPO planning process more important than ever, including greater use of performance measures.

Chapter 6 identifies a prudent, fiscally constrained approach to financing needed investments, totaling almost $113 billion over the next 28 years to 2045. It also identifies what could be accomplished with additional funding (under an aspirational scenario).

Making Connections

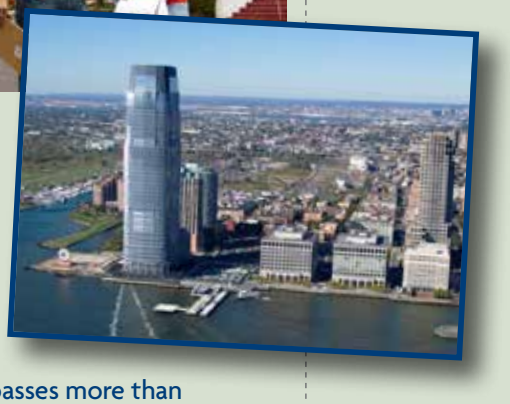
In many ways, Plan 2045: Connecting North Jersey is the NJTPA's most ambitious long-range plan over its three decade-long history as the region's MPO. Leadership in Together North Jersey has given the NJTPA a host of new partners and added vital new perspectives to its planning work. This plan reflects efforts to broaden the reach and scope of the connections made by transportation investments. All the while, the plan promotes a growing regional economy and continued wise stewardship of the region's transportation assets

With support from the NJTPA Board of Trustees and an engaged public, the NJTPA will continue to hone its approach to planning, working in coordination with its member counties and cities to implement the policies and priorities of Plan 2045. Over the next 28 years, guided by this plan, the region will continue to improve and adapt its transportation system to become more **competitive**, **efficient**, **livable** and **resilient**, by connecting people, places and potential.

Together North Jersey

How does North Jersey remain a place where people want to live and where employers want to locate and expand their businesses? These were some of the key the questions nearly 100 partners—local governments, universities, nonprofits, businesses and others—set out to answer through the region-wide Together North Jersey consortium formed in 2011.


RUTGERS-VTC



With the support of a federal grant, Together North Jersey developed the first comprehensive plan for sustainable development for the NJTPA's 13-county region. Finalized in 2015, the plan provides a strategy to make the region more **competitive**, **efficient**, **livable** and **resilient** — the four overarching themes that guide all its recommendations. It details 15 focus areas and over 70 strategies the region can pursue to meet these goals (see back of plan).

You'll see the **competitive**, **efficient**, **livable** and **resilient**, logos in chapter 5, highlighting how the work of Together North Jersey is woven into the NJTPA's blueprint for the region's future.

Together North Jersey's vision encompasses more than transportation. It addresses challenges involving economic development, land use, the environment, education, housing, health, the arts, culture and other issues. The Together North Jersey plan recognizes that the decisions we make in all of these areas—as individuals and as communities—are all connected and affect the larger region.

Led by the NJTPA, Rutgers University and NJ TRANSIT, Together North Jersey funded and assisted capacity building programs, local pilot projects and other related efforts.

The many partners of Together North Jersey are now working to implement the plan. Task forces for each of the themes meet periodically and support a variety of activities.

Here are just a few of the key Together North Jersey strategies that Plan 2045 will support with long-term transportation investments, policies and programs:

Competitive●

ECONOMIC DEVELOPMENT

The NJTPA and Together North Jersey created the North Jersey Regional Comprehensive Economic Development Strategy (CEDS) as a roadmap to increased prosperity and access to opportunities by identifying regional priorities that support local actions. Other economic development initiatives included development of a Hunterdon County CEDS; Talent Network outreach events on port and travel/tourism workforce issues; Somerset County's study of 24 priority growth investment areas; and a corridor vision plan for Route 37 in Ocean County.

Efficient●

TRANSIT ORIENTED DEVELOPMENT

With guidance from NJ TRANSIT, Together North Jersey promotes development around bus and rail transit hubs. The goal is to create interesting, vibrant, walkable areas while increasing transit use. This can help reduce road congestion, yielding many health and environmental benefits. Initiatives have included: a coordinated vision for revitalization around five existing train stations on the inner Morris & Essex rail line and encouragement of mixed-use development around Perth Amboy's downtown train station.

Livable●

CREATIVE PLACEMAKING

Arts and culture enhance quality of life by fostering community pride and identity while boosting local economies by creating jobs, attracting tourists and spurring business investment—whether in bustling downtowns or rural hamlets. Initiatives included: using public art and urban design to enhance the Valley Arts District in the City of Orange and joint efforts by Woodbridge and Rahway to create an arts-driven, transit-oriented downtown revitalization strategy.

GREAT PLACES

Together North Jersey supports communities in implementing Complete Streets policies that make all modes of travel (driving, transit, walking, biking and goods movement) accessible to all users, regardless of age, income, or physical ability. Complete Streets help make places healthy, safe and vibrant. Initiatives included: a Complete Streets Concept Plan for Morris Avenue by the City of Elizabeth and joint efforts by Bloomfield, Montclair, Glen Ridge and Verona on a Complete Streets plan for a 4-mile section of Bloomfield Avenue.

Resilient●

COMMUNITY RESILIENCY

A resilient community is one that is ready for and can recover quickly from adverse events like Tropical Storm Irene and Superstorm Sandy. Such communities take steps to reduce the impact of these events before they even happen. Initiatives included: creating a post-Sandy vision in Ocean County to improve resiliency; developing a model integrating green infrastructure into public and private projects in Hoboken; protecting the City of Passaic's Eastside neighborhood through a proposed levee also serving as a recreational trail; and exploring green stormwater infrastructure pilot projects in Newark.

2 Innovative Public

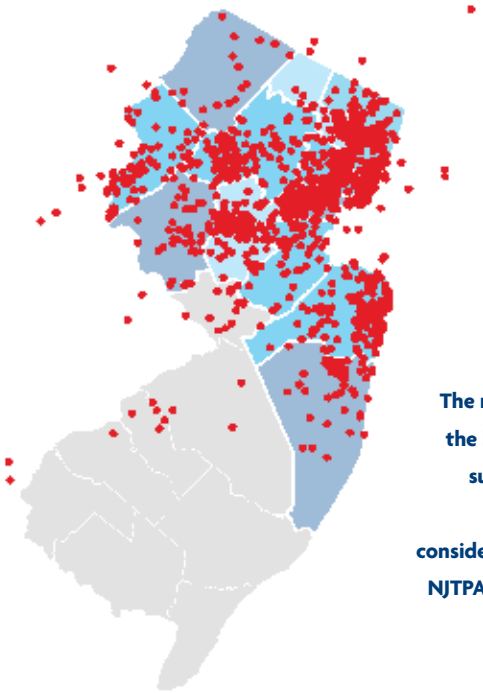
Newark, Essex County

Outreach

Expand access to public transit. Make streets safer for people who walk and bicycle. Improve the region's ability to recover from major weather events. ● These are some of the ideas people who live and work in North Jersey gave when asked to share their vision for the region's future. ● Nearly 3,000 people participated in Plan 2045 through a series of innovative outreach techniques that included in-person events and online surveys. People of all ages and economic backgrounds—from children, to millennials to senior citizens—provided input for this plan. ● Public participation in Plan 2045 far surpassed the outreach of the NJTPA's previous long-range regional transportation plans, which relied on more traditional forms of public engagement. This was in large part due to research into innovative outreach techniques conducted on NJTPA's behalf by Rutgers University's Voorhees Transportation Center (VTC). The innovative techniques have been cataloged in a searchable public website tool. Based on the findings of this research, the NJTPA launched an extensive Plan 2045 public outreach program in spring 2017. ● The seven goals that the NJTPA Board of Trustees set for Plan 2045 (see NJTPA Goals—p. 8) were used to develop transportation-related topic areas. Public outreach focused on:

- Getting Around
- Safety
- Economy
- Technology
- Resiliency
- Environment
- Great Places

The outreach included a variety of activities where staff met with people face-to-face including pop-up booths at community events, customized public workshops, millennial dinner parties, a radio booth to engage children, interactive presentations at conferences and public meetings, a freight industry roundtable, a symposium and special outreach sessions with limited English speakers and low-income residents.



The red dots represent the home zip codes of survey participants, illustrating the considerable reach of the NJTPA's public outreach.

Digital technologies further extended the considerable reach of Plan 2045's public involvement efforts. This included a website, a user-friendly online survey and extensive social media promotion. The survey mirrored the seven topics and related questions used at in-person events, but also included open-ended questions.

Stakeholder Forums

Forums sponsored by the NJTPA discussed key issues for the future that must be considered in Plan 2045. They featured presentations by experts and included lively discussion by interested parties, stakeholders and members of the public. Key events included:

- ***Freight Roundtable—June 14, 2016*** Manufacturers, haulers, railroads, warehouse developers and port operators discussed the challenges facing goods movement. They all agreed that reliability must be improved, infrastructure must keep pace with the growing volume of freight and the freight sector must take advantage of new technology.
- ***Plan 2045: A Regional Conversation—November 2, 2016*** This wide ranging event included discussion of changes in technology and demographic shifts. Among the topics addressed: the waning of suburban office parks and the need to reimagine land use; the attraction of younger people to places with more transit options; the aging population and the need for services to support them; and the promises and threats posed by technology, like autonomous vehicles.
- ***Smart Cities Symposium—April 26, 2017*** Public and private sector experts discussed the promise of emerging technologies including: possible drastic reductions in crashes through connected vehicles that communicate with other cars and traffic signals; self-driving shuttles that improve transit access and efficiency; and streets equipped to better manage traffic with smart parking and adaptive traffic signals.

Public Outreach Events

Public outreach for Plan 2045 was primarily conducted in each of the region's 13 counties and two largest cities at either a **community event** (such as hosting a pop-up booth at an arts festival or street fair) or a **public workshop/meeting**, typically hosted by a county's Board of Freeholders and Planning Department (additionally, customized presentations were conducted at several other meetings and/or conferences). See the Plan 2045 Outreach Appendix for summary reports of the events held in the NJTPA's 15 subregions.


Jersey City


Somerville, Somerset County, Freeholder Peter S. Palmer


Newark, Essex County Executive Joseph DiVincenzo

Community Events

These events were designed to personally bring Plan 2045 outreach to residents where they live, providing an opportunity for a broad range of participation. Eleven of these events were held during spring 2017. Information booths were set up at community events, with banners, signs, and other materials identifying the NJTPA and Plan 2045. A colorful custom-designed tabletop carnival wheel provided a fun way for people to select a topic and get conversations started. The NJTPA's Plan 2045 team (including NJTPA staff as well as Board members and subregional staff) ran the booths and asked residents for their input on one or more of the outreach topics through a brief survey via electronic tablets or paper forms. Additionally, a coloring activity was provided for children who came with their parents.

Spanish interpreters also were on hand at all events (as well as Hindi and Arabic interpreters at select locations). More than 1,600 people participated in Plan 2045 community outreach events.

Public Workshops/Meetings

The NJTPA also conducted a series of interactive Plan 2045 public workshops, meetings, and special presentations. Some of these, co-sponsored by NJTPA subregions, were stand-alone workshops devoted to Plan 2045; others were planned as part of relevant professional conferences or existing public/stakeholder meetings that allowed dedicated time for Plan 2045 discussion.

These workshops and meetings featured a live-polling tool, Poll Everywhere, which enabled participants to answer survey questions on phones or tablets in a group format and see results in real time. Participants were asked open-ended questions and

"We need better planning for bike lanes and pedestrian sidewalks'—Feedback from Jersey City outreach event, May 19

multiple-choice questions. Responses from 264 participants were varied and informative. Survey results for community events and public workshops/meeting events are available in Plan 2045's Public Outreach Appendix.

In general, many who participated in community events and public workshops spoke about the need for expanded or enhanced public transportation, improved pedestrian and bicycle facilities, and better connections where they live and work. Participants also called for safety and infrastructure improvements, asked for help addressing congestion and supported resiliency upgrades across the region.

Throughout spring 2017, the NJTPA extensively promoted all of its upcoming community outreach events, workshops, the online survey, and other ways to get involved


Flemington, Hunterdon County


Technology
Resiliency
Safety


PLAN 2045
Connecting North Jersey
NJTPA


PLAN 2045
Connecting North Jersey
TELL US ABOUT...
Great Places
Safety

PLAN 2045

Public Outreach

TOP ROW: Freeholder John Bartlett (left) in Paterson, Passaic County; Newark, Essex County; Freeholder Carl Lazzaro in Newton, Sussex County; Freeholder Thomas Arnone (second from right) in West Long Branch, Monmouth County

MIDDLE ROW: County Executive Tom DeGise (right) in Jersey City, Hudson County; Freeholder Kathryn DeFillippo (inset, right) in Chester, Morris County; Paramus, Bergen County

BOTTOM ROW: Plumsted, Ocean County; Freeholders Bette Jane Kowalski and Angel Estrada in Mountainside, Union County; Freeholder Jason Sarnoski in Harmony Township, Warren County

in the development of Plan 2045 via Twitter, Facebook and YouTube. And, during the events, staff shared real-time tweets and photos with the NJTPA's followers.

Highland Park, Middlesex County

Specialized Outreach

In addition (and concurrently), the NJTPA worked with Rutgers-VTC to craft four specialized initiatives aimed at traditionally hard-to-reach demographic groups: young adults (18-30 years old), children and young teens, limited-English proficiency (LEP) residents, and low-income residents. All specialized outreach initiatives were customized for each group; however, like the general public outreach, they also were based on the seven transportation-related topic areas. Summary reports are included in the Public Outreach Appendix.

Set the Table

For young adults (sometimes referred to as millennials), a "Set the Table!" dinner party program was designed, featuring a fun "meeting-in-a-box" to clearly guide each host through their event including

"Public transit only goes to Manhattan and does not connect in ways we actually move."
—Set the Table response on getting around

discussion cards with questions and facts about the region to jump start conversation. Approximately 160 millennials participated in this activity.

Many young adults expressed an eagerness to stay involved in the transportation planning process as Plan 2045 is implemented going forward. Some said public transportation options, small businesses and access to a downtown area; diversity; and close proximity to New York City and other amenities were what they liked best about their communities. But they expressed concerns about a need to improve safety and also their ability to stay in New Jersey long-term due to high housing costs and taxes.

Others noted that public transportation is a very desirable amenity, but added service needs to be more widespread and reliable with better station infrastructure. Nearly all young adults indicated support for expanded and safer bicycle and pedestrian infrastructure. Many also consider climate change to be a very important issue and suggested encouraging and incentivizing "green" practices.

NJTPA On Air

For children, a pop-up booth designed to look like a radio studio—called "NJTPA On Air"—provided a fun, interactive opportunity for children and young teens to record their thoughts on the future of transportation in their own voices. They were then asked to talk into the microphone and describe what they imagine transportation will be like in the future.


New Brunswick, Middlesex County

Approximately 200 children participated.

Many children imaginatively envision a future that includes everything from flying cars to teleportation; but some also talked rather eloquently about mitigating the environmental impacts of transportation, efficient Hyperloops, and alternative fuels. Several participants also said they thought they would use self-driving cars to get around in the future.

Limited English Speakers

In addition, six workshops were conducted at English as a Second Language classes to reach LEP residents. A four-part classroom activity introduced approximately 150 students to new vocabulary and provided an opportunity (either spoken or in writing, enabling students of varying English proficiency to participate) to improve fluency and confidence in discussing issues

"It's easy if we can drive. It's hard because public transportation is not convenient."
—ESL response when asked about getting around

that affect their communities.

Many ESL students spoke optimistically about the region's future and highlighted the need for improved transportation to access jobs and other opportunities. Several participants said that without cars they would have a difficult time getting from where they live to their places of employment and shopping destinations. This group also requested sidewalks improvements to make it easier to get around their communities.

Low-income Outreach

Finally, for low-income residents, the NJTPA and Rutgers-VTC partnered with two established organizations, La Casa de Don Pedro in Newark and Eva's Village Recovery Community Center in Paterson. With the assistance of trusted advocates at both organizations, two workshop sessions were conducted, gathering input from about 150 participants.

Many in attendance pointed to the importance of public transportation to access jobs. Participants raised concerns about the need to transfer buses several times to get to where they need to go. They also cited a lack of service during off peak-hours and noted that more frequent buses would make it easier for them to use public transit.

Newark, Essex County

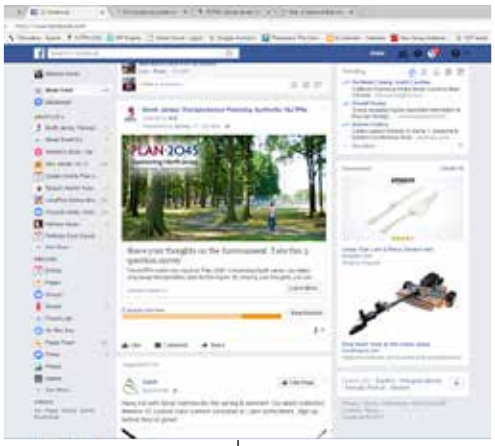
"We need buses running at off-peak hours and the buses don't run frequently."
—Low-income outreach response on getting around

Digital Outreach

WEBSITE

The NJTPA created a special section of its website (www.njtpa.org/Plan2045) to host a Plan 2045 survey open to anyone, whether or not they had ever heard of the NJTPA or participated in an outreach event. The survey, offered in English and Spanish, mirrored the approach at the NJTPA's community events, public workshops and meetings. It included short, narrated videos as a primer.

The Plan 2045 survey also included simple demographic questions that enabled the NJTPA to learn a bit more about who participated. Nearly 500 people responded to the survey via the Plan 2045 website; more than 500 others answered one or more survey questions via Facebook (described in more detail below).



PAID SOCIAL MEDIA

To reach an even wider audience across North Jersey, the NJTPA incorporated a strategic social media component into its outreach efforts. Paid advertising, primarily on Facebook, was implemented over six separate one-week advertising campaigns. The ads were customized and demographically targeted to encourage residents to take the Plan 2045 survey on the NJTPA website (where the entire survey was available) or through Facebook (where select survey topics were provided).

The NJTPA's paid social media campaign began with a series of 16 ads focusing on all seven topic areas developed to promote the Plan 2045 survey. Ads were targeted toward all adults in the NJTPA region and included a link to the online survey.

Further refinements helped make it easier for people to participate in the Plan 2045 questionnaire by utilizing a Facebook survey feature instead of requiring visitors to click a link to visit the Plan 2045 webpage.

During the combined six-week advertising campaigns, Plan 2045 social media ads were seen approximately twice by more than 1.6 million people. This resulted in more than 3.1 million "impressions" (the number of times an ad is viewed overall), more than 50,000 link clicks, and 500 Facebook surveys completed. The resulting by-products of the ad campaign, such as social media comments, likes and shares also succeeded in another important way: increasing overall brand awareness about Plan 2045 and the NJTPA and introducing more residents to the transportation planning process in general.

What We Heard

While Plan 2045 outreach efforts drew participation from a diverse audience from across North Jersey, common themes emerged. These themes were used to inform the plan's Regional Capital Investment Strategy (RCIS), a set of broad principles that sets goals for funding different types of initiatives (outlined in Chapter 6). Common themes (in addition to those mentioned above) included:

- Need for greater access to local public transportation as well as having better public transportation access to New York City from the western and southern counties in the region, with emphasis on the need for the Hudson River Tunnel project and the Gateway Program.

- Various enhancements and upgrades to public transportation with more service and better reliability, including one-seat transit rides to New York City.
- More commuter parking, improved roadway conditions, and safe travel to schools, as well as improved traveler information (such as developing new multimodal transportation apps).
- Some suggested that planners need to look at transit more comprehensively as a system, rather than as individual components.
- A sense of community and safety were important to many people. Participants noted a lack of affordable housing choices, especially for low-wage and entry-level workers, as well as for young adults.

"Regional planning should support economic development."—Response from Sussex County public outreach event, May 31, 2017

- Residents also said they want better resiliency measures to protect against future weather events (such as not permitting new construction on low-lying, flood-prone grounds) and emergencies.
- Some residents noted that city populations are growing without regard to capacity; others said better planning is needed for sidewalks and crosswalks, with some noting that many traffic signals seem to be geared for cars instead of bicycles and pedestrians.
- Participants called for more bicycle infrastructure, including protected bike lanes, bicycle parking and a need for more bike-share programs.
- Several residents expressed safety concerns about self-driving cars, but said they would be open to using an autonomous shuttle or vehicle if it were on a fixed route.
- Some suggested technology and infrastructure upgrades, such as supporting alternative-fuel vehicles and addressing congestion, to improve air quality.

The ultimate goal of the NJTPA's public outreach project was accomplished: to use new and innovative engagement strategies to gather public input and inform and enlighten Plan 2045's development. As a result, Plan 2045 effectively responds to the daily transportation challenges shared by the region's 6.7 million residents. It also reflects the aspirations they hold for their communities in the next 30 years.

Go Farther: Regional Coordinated Human Services Transportation Plan

As part of a separate effort, the NJTPA also conducted extensive outreach to identify the transportation needs of seniors, low-income people, veterans and individuals with disabilities.

This outreach was part of an effort to update the NJTPA's Regional Coordinated Human Services Transportation Plan (CHSTP), which was adopted in 2008. The 2017 CHSTP update, *Go Farther*, was used to inform development of Plan 2045.

CHSTP outreach efforts included focus groups, online and paper surveys (gaining more than 4,000 responses), community planning sessions (a series of 46 events organized by the state's eight Transportation Management Associations), discussions with professionals who provide services to these targeted groups and an advisory committee. All of the input gathered from this extensive outreach was used to develop the CHSTP plan, which offers 33 recommendations.

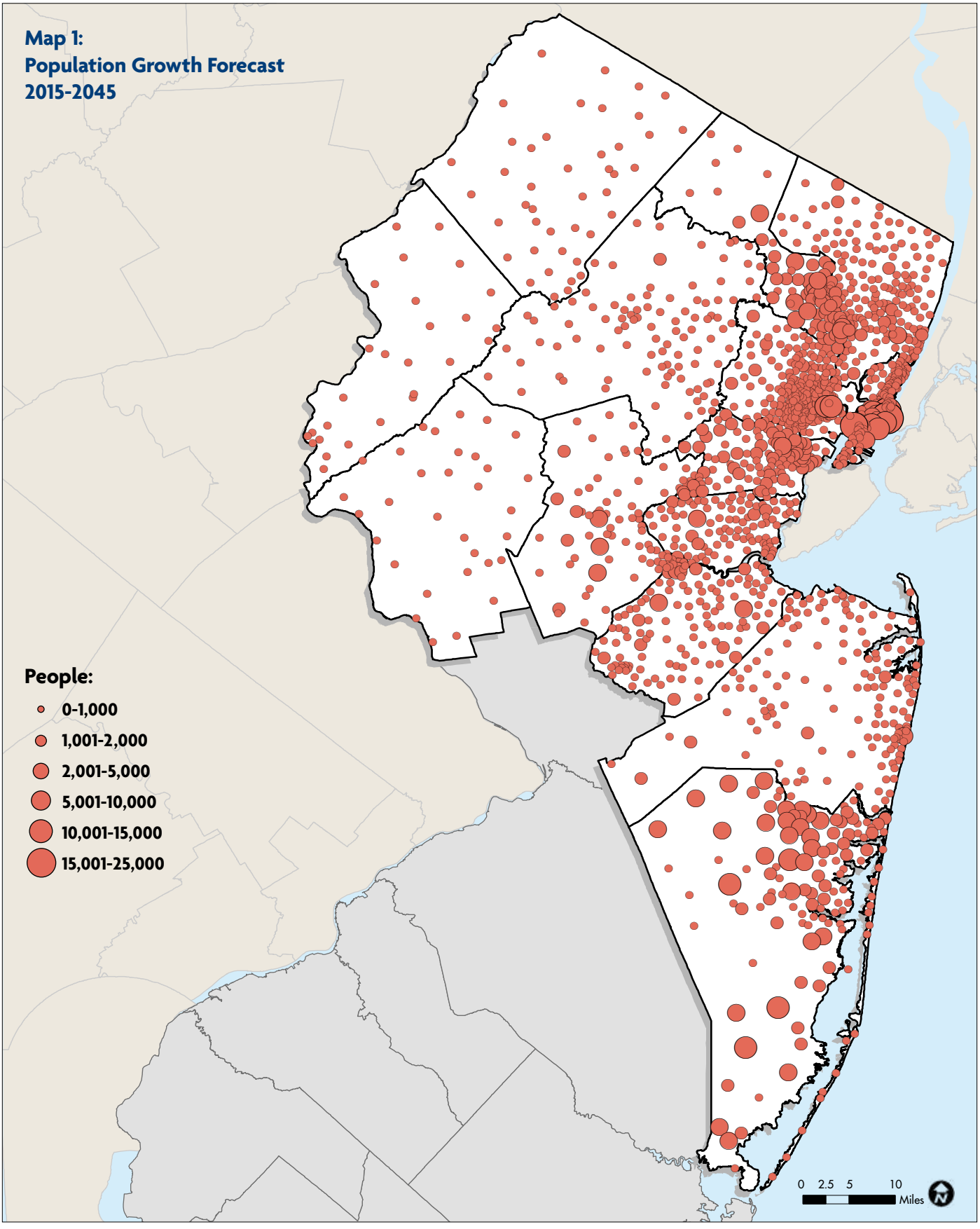
Among the CHSTP recommendations are offering more affordable transportation options; maximizing resources by identifying common destinations in the region; removing physical barriers for people with limited mobility; and enhancing and expanding service.

3 Regional Context

Englewood, Bergen County

& Trends

Plan 2045 seeks to continue the work started under Together North Jersey to make the region more competitive, efficient, livable and resilient. Realizing these ambitious goals while responding to the public's call for expanded and improved transportation options begins with a careful assessment of the current condition and performance of the transportation system and an in-depth evaluation of trends that will affect it over the next 30 years. ● This chapter provides that assessment and evaluation. It sets the foundation and context for informed decision making to address the region's many challenges, which include severe road congestion and unreliable travel times in many locations; the need to repair aging or outmoded facilities; a bus and rail transit network carrying many commuters but with limited reach to many destinations; lack of facilities for safe walking and biking in many locations; and a host of others. ● The chapter also explores possible "game changers" that could dramatically alter life and transportation in the future. Some of these are already on the horizon—including the deployment of self-driving cars and trucks. ● But this plan aims to do more than simply react to current and emerging challenges. It takes an active hand in helping shape the future of the region. Here the NJTPA's partnership with organizations in Together North Jersey is vital. ● By coordinating transportation investments with other aspects of community life—economic development, education, the arts, social services, among them—the NJTPA and its partners can help strengthen communities with the involvement of all residents.



Source: NJTPA, 2016; Esri, 2017

As highlighted in the Together North Jersey section (p. 14), strategies for accomplishing this include promoting transit-oriented development near bus and rail terminals; developing corridor-wide economic development plans; and reconfiguring streets and intersections to work more efficiently and safely for all users.

This chapter identifies several current trends—including changes in household composition, technology and lifestyles—that provide opportunities to guide regional growth in directions that will meet the goals of Plan 2045. Specific strategies and their impacts are explored in later chapters.

Demographics

Key demographic trends and their implications for transportation include the following:

A growing population From 2010 to 2015, the region's population grew from 6.6 million people to 6.7 million people. By 2045, population is expected to increase by 17 percent to approximately 7.7 million (Map 1). This growth could increase travel demand across the transportation system, adding to congestion and other problems if the region does not effectively prepare for it.

But where and how this growth occurs will affect the region's possible responses. In the past several years growth patterns have undergone a dramatic shift. The long trend of suburbanization that dominated the post-World War II era—in which population and jobs shifted steadily outward from the state's northeastern urban core—is weakening and in some respects reversing. Map 2 tells the story. Suburban and rural counties like Ocean, Monmouth and Hunterdon, which captured the most growth in the 1970s and 1980s, have seen flat or declining growth in recent years. The top growing counties are now the relatively dense urban core counties of Bergen and Hudson.

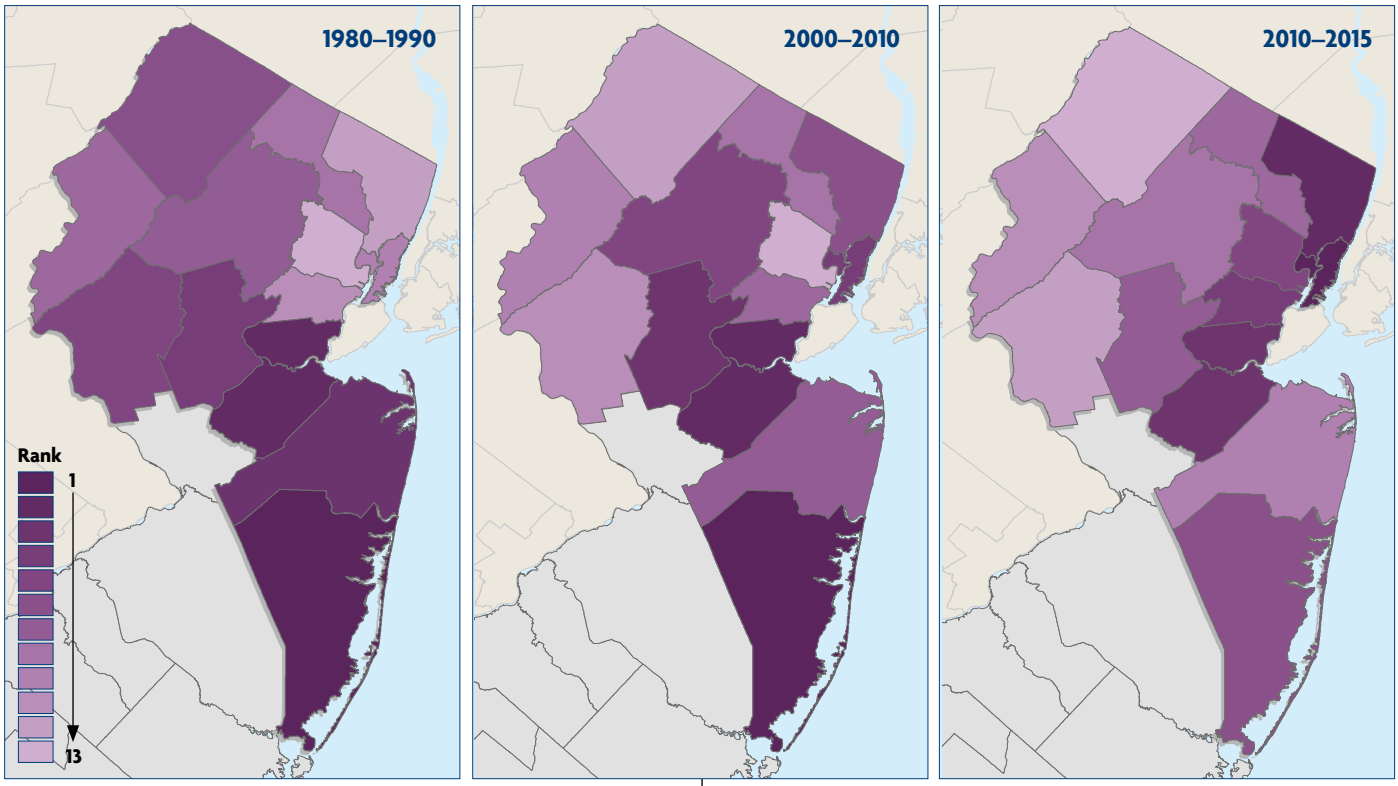
These trends are also visible at the municipal level with three of New Jersey's four largest cities—Newark, Jersey City and Elizabeth—showing significant population gains from 2010-2016. Eight of the top 13 municipalities in absolute growth and four of the top seven municipalities in percentage growth were in Hudson County, the region's most urbanized county. Places like Harrison and Jersey City are seeing major redevelopment that is helping to attract residents interested in easy access to New York and the major cities in North Jersey. This redevelopment often features walkable, mixed-use environments that allow residents to walk, bike or take transit to meet most of their travel needs.

The renewed attractiveness of these areas, as well as older suburbs in and around the northeast urban core, provides opportunities to realize transit-oriented development and other approaches to greater transportation efficiency, improved quality of life and other related goals.

Millennials Roughly defined as the generation born in the early 1980s through early 2000s, millennials have overtaken the baby boom generation as the largest living generation—totaling about 75 million nationwide. The lifestyle choices of a large share of millennials are helping drive urban resurgence and land use changes. This includes greater preference for living in urban and walkable neighborhoods, and openness to non-driving forms of transportation.

Red Bank, Monmouth County

Map 2: Absolute Population Growth by County-Rank



Source: U.S. Census, 1980-2015, NJTPA, 2017

People 16 to 34 years old drove 23 percent fewer miles in 2009 than they did in 2001—the largest decline in any age group, according to "A New Direction," the 2013 report by US Public Interest Research Group.

Real estate developers, retailers and others seeking to tap the spending power of millennials moving into their prime earning years have responded by investing in the urban core and in other denser, walkable areas. But the question remains: will these changes endure? This generation has delayed having children in comparison to previous generations, possibly due to financial difficulties from the Great Recession, stricter mortgage requirements, or the higher cost of living today compared to decades past. Will having children motivate many millennial families to move to the suburbs or rural areas as their parents did? It is still too early to tell.

This plan takes a balanced approach to these uncertainties, supporting redevelopment of urban areas and downtowns while continuing to strengthen less dense suburban and rural communities. The NJTPA seeks to work with these communities to improve the efficiency of their transportation networks, preserve open space and enhance transit options.

An aging population The region is home to an increasing number of households with people age 65 and older, as seen in Figure 3-1 at right. Based on the 2011-2015 Census Bureau's American Community Survey (ACS), the highest concentrations of people over age 65 were found in Ocean (22 percent), Bergen (16 percent) and Warren (15 percent) counties, each exceeding the New Jersey statewide average of 14 percent.

Approximately 27 percent of those over 65 live alone, and this population is projected to increase by nearly 50 percent over the next 30 years as baby boomers age and as average life expectancy increases.

An older population means more elderly drivers and more people who do not drive. Making roads easier to navigate through modified design and signage and providing attractive transportation alternatives such as transit, paratransit and walkable streets supports senior mobility and helps maintain quality of life. Seniors and empty-nesters are tending to downsize and relocate to smaller homes and older adult communities. This trend also supports transit-oriented

development and the creation of walkable areas.

Migration Population growth is impacted by migration from other states and other countries. From 2010 to 2015, 90 percent of New Jersey's population had not moved during any given year, and of those who did about three-quarters moved within the state. But there is also significant movement of people to and from the state. ACS indicates that nearly 76,000 people left from 2011-2015. A national survey of moving companies placed New Jersey as the state with the highest number of people moving to other states, largely for jobs or retirement. The state's relatively high taxes and cost of living likely contributed to many such moves.

The state continues to attract immigrants from other countries. The foreign-born population more than doubled between 1980 and 2010. According to one estimate, New Jersey had the fifth largest immigrant population among states in 2015. About 62,000 foreigners moved into the state that year, according to ACS. From 2010-2015 two-thirds of total international immigration to the state settled in four counties: Hudson, Middlesex, Bergen and Essex, according to Census data. Many of these immigrants have low incomes and depend on transit for daily travel needs.

Racial composition Following national trends, the region's population is increasingly composed of racial and ethnic minorities (principally African-Americans and Latinos). Together, these groups comprised 44 percent of the population from 2010-2014 as compared to 36 percent in 2000. Ethnic and racial minorities comprise more than half of the populations of five counties: Hudson (70 percent), Essex (68 percent), Union (57 percent), Passaic (56 percent) and Middlesex (53 percent). Like immigrant populations, minority populations historically have had lower incomes and have been concentrated in urban centers, relying more on transit for day-to-day mobility, raising equity concerns, as discussed below.

Employment

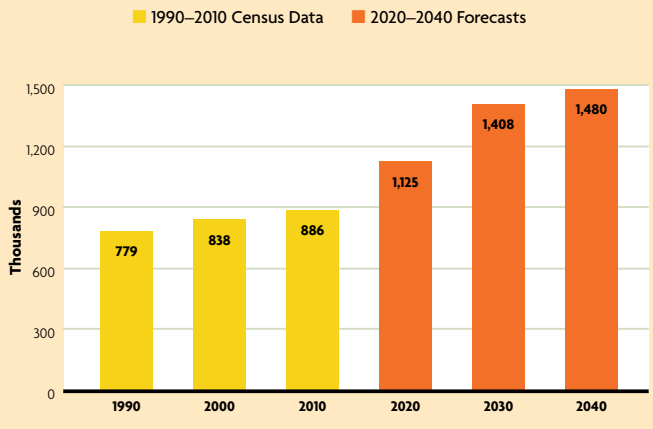
New Jersey and the NJTPA region have realized considerable progress in recovering from the Great Recession of 2007-2009. Looking at only payroll jobs—excluding workers who are self-employed, which is approximately 8 to 9 percent of the total—employment peaked at 3.1 million jobs in 2007 before declining to 2.8 million during the lowest point of the recession early in 2010.

The region recovered most of these jobs by the end of 2015 and appeared to have recovered all of its pre-recession payroll jobs by the end of 2016. Unemployment rates reflect this recovery: the rate stood at 4.2 percent in July 2017. Payroll employment is projected to continue to increase to 3.4 million by 2045, a 14 percent increase from 2015, as shown in Map 3. Like population growth, job growth will put more demand on all aspects of the transportation system.

Also mirroring population growth, the long-standing trend of outward movement of jobs from the urban core is reversing. Companies that favored corporate campuses in suburban or rural areas in the 1980s are moving jobs back to the urban core and downtown areas, particularly walkable locations with transit access. In part this is to attract and retain younger workers who also favor these locations. Corporate leaders also are seeking greater opportunities for creative collaboration, proximity to customers and business partners and centralization of operations.

Left behind are large office campuses with too much square footage for a single tenant in the current real estate market. Examples include the sprawling former Merck campus in Whitehouse Station in Hunterdon County and the former Sanofi Research

Figure 3-1:
NJTPA Region: Population Age 65 and Over



Source: U.S. Census, 1990-2010; NJTPA, 2017

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Game Changer—The Future Workplace

Changes in the nature of work, brought about by new technologies and business practices, could drastically change commuting and travel patterns —although it is difficult to predict exactly how this would occur. While traditional commutes between home and a centralized workplace may decline, travel to other destinations, for other purposes and at different times of day may increase. Among the diving forces:

Gig economy—Companies are increasingly using contingent workers—freelancers or contractors—tapping into a marketplaces served by specialized apps.

Remote work—Telecommuting and teleconferencing —possibly augmented by virtual reality—are breaking the proximity requirements for companies and workers.

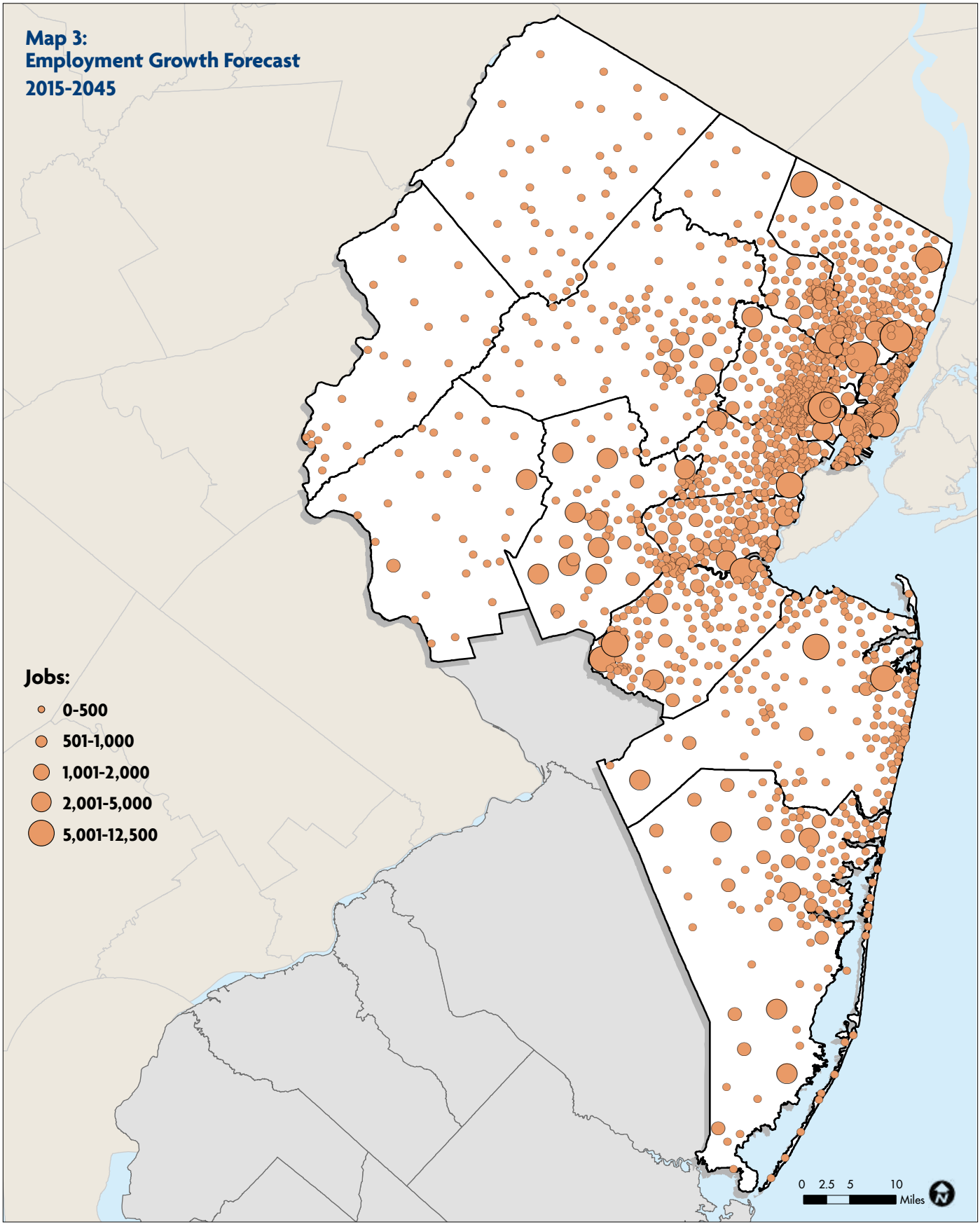
AI, Robotics—Computer systems and robots will increasingly perform both physical and intellectual work. While jobs will be lost, new ones will be created in designing, building and maintaining the systems. Future workers will have to be better trained and adaptable. High tech jobs sites may provide redevelopment opportunities.

facility in Bridgewater in Somerset County. Both are undergoing repurposing with a mix of uses—including offices, retail, businesses and apartments—giving them more of the features of favored downtown areas. Merck shifted its operations to a more urban setting in Union County. Meanwhile, in Monmouth County, Bell Labs in Holmdel has transformed to Bell Works, a mixed-use development that dubs itself a "metroburb" and is attracting a range of startup and established businesses. Efforts are underway to establish a shuttle bus linking Bell Works and the Hazlet station on NJ TRANSIT's North Jersey Coast Line. This is an example of the type of transit access that will need to be considered as former corporate campuses are transformed into mixed-use developments. In keeping with the priorities of Together North Jersey, this plan supports effective reuse and redevelopment of older facilities in ways that will strengthen communities, enhance the economy and protect the environment.

Meanwhile, jobs will continue to shift to the service sector, which now makes up 45 percent or more of the workforce. Manufacturing employment fell from 9 percent of total nonagricultural employment in 2000 to just under 5 percent in 2015. In coming decades, however, employment could expand in specialized high-tech manufacturing, such as robotics or 3-D printing, and undergo other technology-driven changes (see Game Changer—The Future Workplace, at left). Burgeoning services sector jobs will continue to be split between low-wage, fast food type jobs and well-paid jobs requiring specialized training, such as teachers, nurses and managers. In the latter category, financial sector jobs also grew from 9.6 percent in 2000 to 12 percent in 2010, partially due to the attractiveness of Jersey City for firms in the sector.

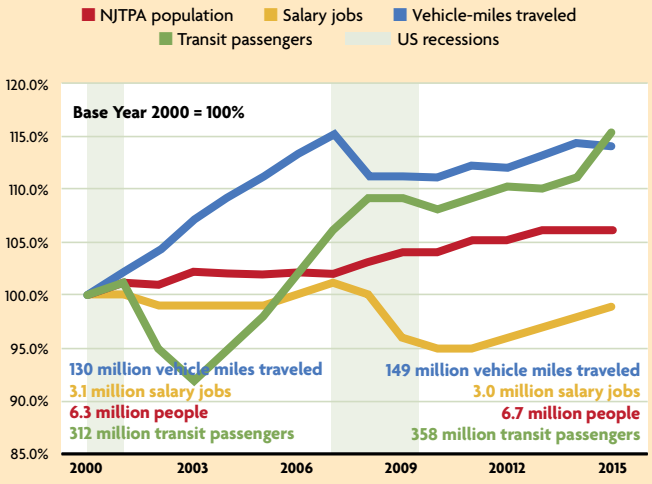
Projected forward, these trends point to the importance of improving education and training for workers. The NJTPA, through Together North Jersey, is coordinating with Workforce Investment Boards and other agencies to help workers adapt to new job markets, including improving transportation access to training programs and job sites.

Map 3:
Employment Growth Forecast
2015-2045



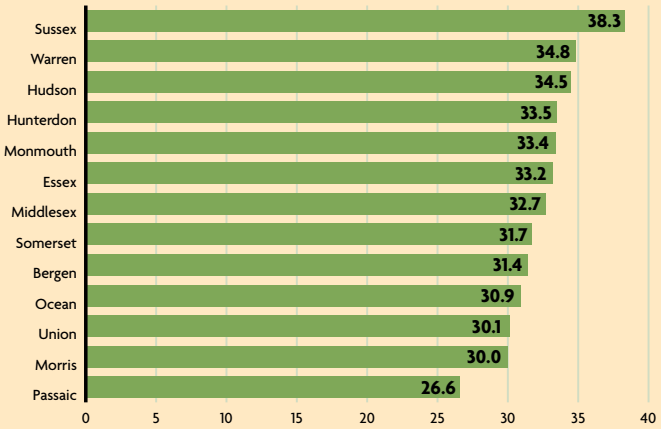
Source: NJOIT, 2008; NJTPA, 2016; Esri, 2017

Figure 3-2:
Change in Population, Jobs, VMT and Transit Use, NJTPA Region *(Compared to 2000)*



Source: U.S. Census, U.S. Bureau of Economic Analysis, NJDOT, NJ TRANSIT, PANYNJ

Figure 3-3:
Travel Time to Work, NJTPA Region, ACS 2010-2014
(in minutes)



Source: Census 2010-2014 ACS 5-Year Estimates

Income

New Jersey's median household income of $70,000 in 2010 was the second highest in the nation, with the national median income at $52,000. The benefits to residents, however, are somewhat offset by a higher cost of living, estimated in 2014 to be 25 percent greater than the national average.

Even with a higher than average median income, about one-tenth of the residents in the region live in poverty. In 2010, the counties whose poverty rate exceeded the statewide average of 10.3 percent were Essex (16.7 percent), Hudson (16.5 percent), Passaic (15.7 percent), Ocean (11.2 percent) and Union (11.1 percent). As noted, low- income residents—including a significant share of minority and immigrant communities—are more likely to depend on transit, particularly buses, for essential travel. NJ TRANSIT's extensive bus network serves communities across income levels, connecting lower income areas with critical employment and educational opportunities, services and recreation.

This plan seeks to address the needs of low-income, minority and other underserved communities with equitable transportation investments. This includes supporting community redevelopment that accommodates affordable housing, enhances transportation options and is inclusive of the region's diverse population. Improving transportation options can make communities more "location efficient," lowering residents daily travel expenses while allowing them to afford better housing and an improved quality of life. This and other approaches to achieving equity for all communities are being advanced through the NJTPA's cooperation on Together North Jersey initiatives.

Transportation Trends

As economic conditions improve and the region continues to grow, investments must be made to ensure the network can accommodate a significant increase in both local and regional trips being made by residents and businesses.

Figure 3-2 shows the previously discussed relationship between population and employment trends and the key transportation measures of vehicle miles traveled (VMT)—a standard measure of the amount of driving—and transit ridership. While VMT increased at a faster rate than population before the Great Recession, the rate of growth has decreased since the recession, partly due to slow recovery in payroll jobs. Over the life of this plan, VMT is expected to grow moderately, by about 16 percent, roughly mirroring population growth (17 percent). Maintaining this modest rate of growth will depend on the success of efforts to expand transit availability and reduce the number and length of auto trips through more efficient land use, in keeping with the priorities of Together North Jersey.

Auto use will remain the dominant mode of travel

in the region, though autonomous vehicles and ride hailing may one day significantly alter how this travel occurs (see Game Changers p. 37 and p. 40). A majority of commuters—70 percent—drive alone to work, while 8 percent travel by auto with other people.

At the same time, transit ridership grew fairly steadily post-recession, reflecting the continuing economic importance of the transit system. New Jersey has the second largest transit network in the nation (behind New York). However, access to frequent bus and rail transit is limited to a relatively small geographic area of the region and is directly influenced by the land use development decisions discussed earlier.

Data from ACS and a 2011 Household Travel Survey conducted by the NJTPA provide additional insight into the commuting trends across the region (Figure 3-4):

- The percentage of commuters using public transportation increased from 11 percent in 2000 to 13 percent in 2010. Hudson County had the highest rate at 40 percent, followed by Essex County at 20 percent.
- Over 290,000 (or more than 9 percent) of the region's residents commute to Manhattan for work. Hudson had by far the highest percentage of resident work trips going to Manhattan at 26 percent (Bergen was second at 15 percent).
- Over 75 percent of Manhattan-bound commuters use transit, highlighting an ongoing need to improve trans-Hudson capacity.
- 70 percent of commuters drove alone, a rate lower than most major metropolitan areas across the country.
- 34 percent of NJTPA residents work outside their county of residence but within New Jersey, and an additional 14 percent work outside the state.
- The mean travel time to work has remained approximately the same since 2000 at between 31-32 minutes, six minutes higher than the national average (see Figure 3-3).
- Passaic County has the shortest average commute time of 26.6 minutes, and Sussex County has the longest average commute time of 38.3 minutes.
- 3 percent of work trips were made by foot. In the region's densest urban neighborhoods, such as Hoboken, upwards of 30 percent of trips for all purposes are walking trips. In large-lot suburban, exurban and rural areas, like portions of Monmouth, Hunterdon and Warren counties, auto shares are over 90 percent.
- About 12 percent of NJTPA households did not own a vehicle. Hudson (32 percent) and Essex (23 percent) counties contain the highest concentration of households without vehicles. The reasons for this may be due to better transit options and more compact, pedestrian-friendly land uses (especially in the primary cities of Jersey City and Newark), as

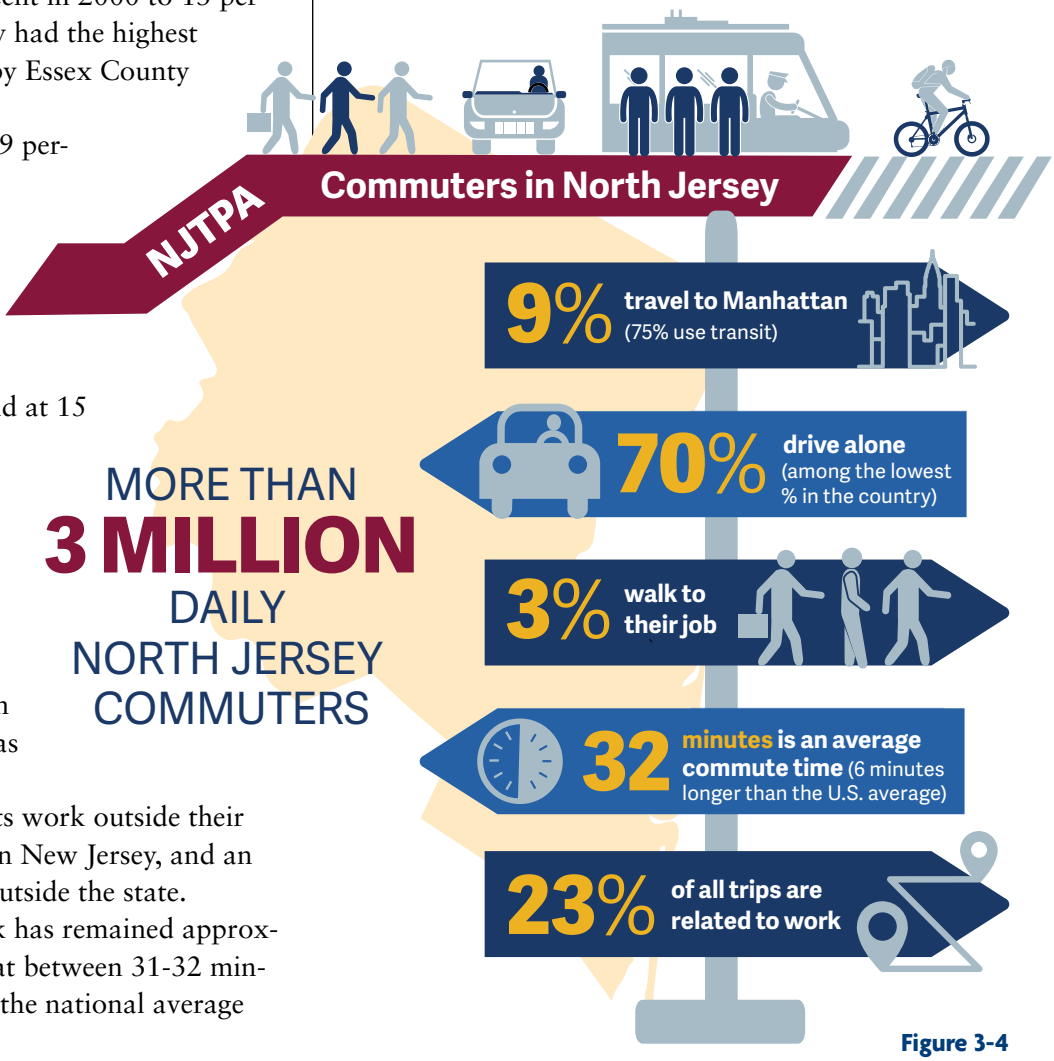


Figure 3-4

Game Changer—Transportation Tech

In coming decades technology advances will transform the transportation system along with other aspects of daily life—just as the internet and smart phones did over the past two decades. Beyond autonomous vehicles (see related sidebar), there are a host of emerging and possible technologies that must be considered:

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Connected vehicles—Whether autonomous or human driven, future vehicles will incorporate technologies to communicate with one another and with the landscape they move through, improving efficiency, responsiveness to users and eliminating up to 80 percent of non-impaired vehicle crashes, according to one estimate.

Wired Roads—Networks of computerized traffic signals are already being deployed. Roadside technologies will also relay information and data to connected vehicles and aid centralized management.

Beyond Gasoline—All car companies are investing in electric and hybrid vehicles, with hydrogen power systems a distinct prospect. The vehicles will require investments in fueling and other infrastructure.

Drones—They are already being used for surveillance, surveying, inspection and monitoring. Their use will expand, with adaptation for deliveries, and even flying cars being explored.

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Real time data—Data gathered from cell phones, roadside monitors and other sources are used to help manage systems, provide travel info and increasingly to predict travel patterns and guide planning.

Transit tech—Connected and automated vehicle technologies will extend to buses and shuttles. NJ TRANSIT buses are already utilizing signal pre-emption technology, and crash avoidance/detection technology is becoming common around the country. Train systems will get faster and more energy efficient. The future may include game changing technologies such as maglev and hyperloop systems. An upgraded Northeast Corridor, including the implementation of the Gateway Program, could underpin wide economic expansion. Future transit tech may include automated, off-board fare collection and further creative use of mobile apps and real-time data.

well as higher rates of poverty and the inability to afford a private vehicle and the associated costs of insurance, registration, maintenance and other fees.

- 54 percent of all trips are between home and destinations other than work (e.g., social/recreation, shopping, school, etc.); on weekdays, 23 percent of trips involve the workplace.
- Household composition plays a large role in determining how much people travel. Women in two-parent families with children make 1.5 more trips than men.

Accessibility and Connectivity

When transportation works well, it puts travelers' desired destinations within reasonable reach, making them accessible—a key concept guiding informed transportation decision making. Accessibility varies greatly throughout North Jersey. By their nature, denser areas offer greater accessibility and support a wider mix of transportation modes. Yet, in all areas residents need to be able to accomplish essential activities within reasonable times and at reasonable costs.

A key obstacle to accessibility is congestion. Crashes, weather events, roadway construction and capacity limitations are frequent causes of congestion. Of increasing importance, however, is how predictable or reliable travel times are. Travelers recognize that to some degree traffic congestion is an intrinsic part of life in a dynamic and active metropolitan area. What can be more frustrating is when travel times vary greatly from day to day, making it necessary to budget significant extra time to ensure on-time arrival. New traffic measurement technologies enable the NJTPA to assess congestion and the predictability of travel. The NJTPA applies such data within its federally mandated Congestion Management Process (see CMP Appendix) to systematically identify suitable strategies to address needs.

As seen on Map 4, many of the region's interstate highways and state and county arterial roads have sections with unreliable travel times. The map highlights road segments that exhibit the most unpredictable conditions, where speeds regularly drop far below normal. Those segments shown take into account the type of place and class of road. For instance, the levels of unreliability are greatest on major corridors leading to bridge and tunnel crossings into New York City

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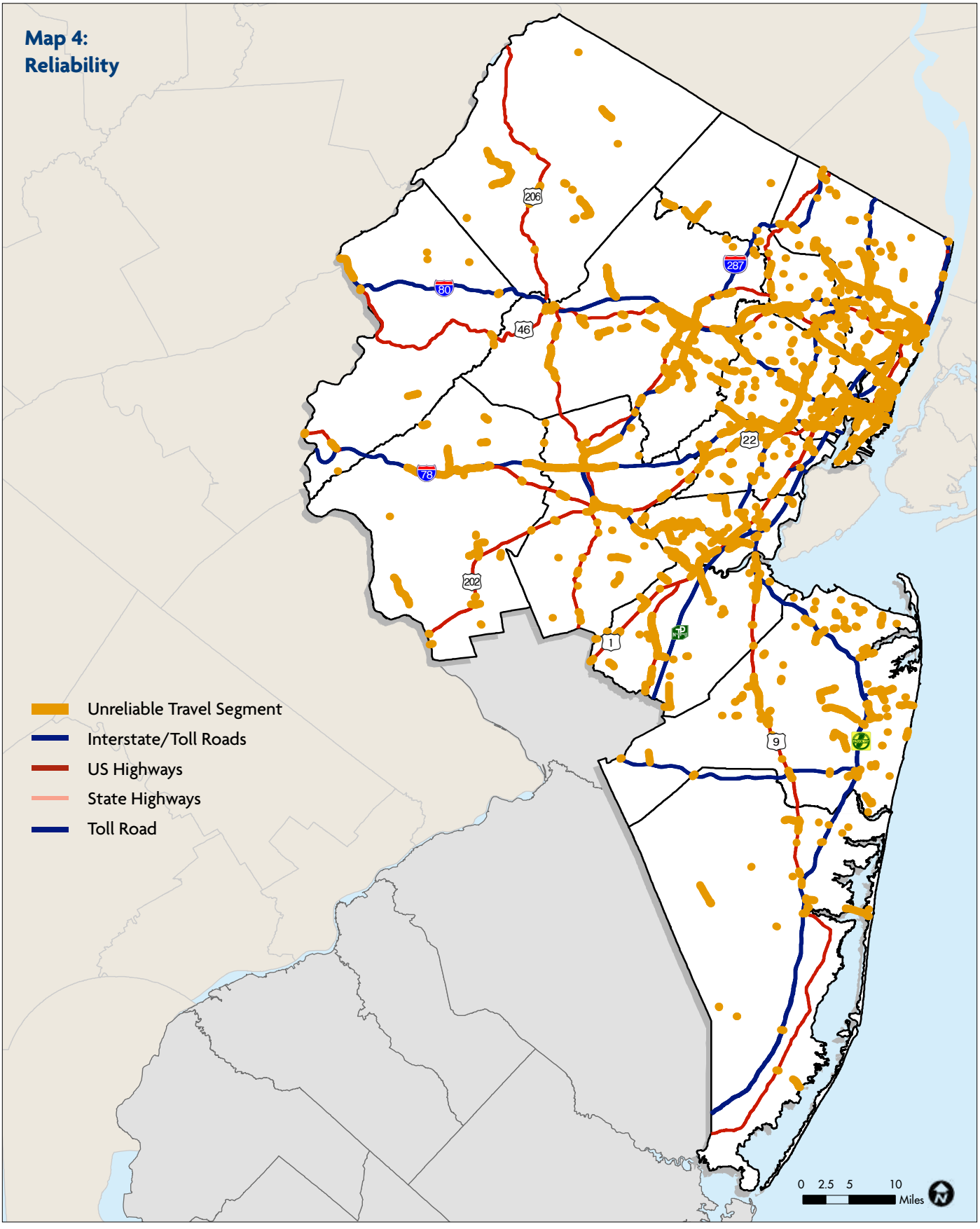
Game Changer—Autonomous Vehicles on the Cusp

By 2020, major car companies will begin rolling out their autonomous vehicles for selective use around the United States. It may take years for them to be perfected. But through 2045, many experts say, they will be fully integrated into the transportation system and in widespread use.

Their impacts on the transportation system are likely to be profound, though there are many questions:

- Will they encourage people to take more auto trips, enhancing personal mobility but further clogging roadways and undermining transit?
- Will they provide new forms of transit—such as on-call shuttles and buses—improving efficient use of roads?
- Will they enhance the existing transit system by providing more convenient access to stations and transit hubs?
- Will they lead to further suburban sprawl or support circulation in growing downtown areas?
- Will automated rides be affordable to all people?
- Will they be able to operate safely around all travelers—pedestrians, bicyclists, motorcyclists, wheelchair users?

Map 4: Reliability



Source: NJOIT, 2008; NJ TRANSIT, 2013; NJDOT, 2014; NJTPA, 2016; Esri, 2014

and those that serve important New Jersey business districts including those in Newark and Jersey City. (The highlighted roads in rural areas are relatively unpredictable compared to other roads in rural areas, but are more reliable than urban roads.)

Maps 5 and 6 show a key measure of accessibility, the percentage of commute trips that are accomplished within 45 minutes by car and 60 minutes by transit. Overall, about 80 percent of auto commutes in the region are less than 45 minutes, falling slightly from 84 percent in 1990 (implying more long trips now and slightly lower overall accessibility). Commutes are longest for parts of Hunterdon, Warren and Sussex counties, and shortest in older, denser suburbs in Passaic, Union and Bergen counties.

Transit commute trips tend to be longer than auto trips, but time spent on public transit is generally more acceptable to travelers who can work, read or socialize while traveling. About 50 percent of the region's commuters who use public transit have work trips under an hour. But in the urban core that number is much higher, topping 70 percent in transit-rich areas of Hudson and Essex counties.

A more detailed examination of accessibility highlights how the transportation system connects people to where they want to go. In 2016, the NJTPA assessed the system's connectivity by analyzing 60 origins and destinations, identifying accessibility needs, many of which focused on the need for more transit alternatives. The findings, organized by place type and travel markets, include:

CONNECTIVITY TO NEW YORK CITY

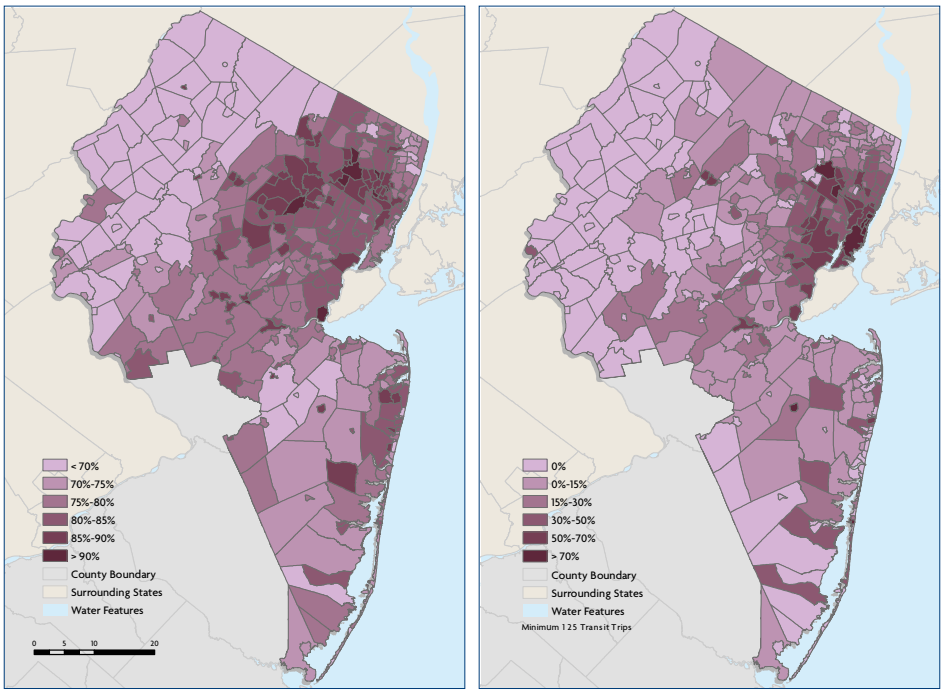
- On many direct bus and rail transit routes to New York City, travel times are competitive with auto. In some suburbs and rural areas, access to existing bus and rail lines might be improved. Commuters in these areas rely on park and ride lots, shuttles and other options to get them from their homes to their transit stops. Such access to the transit system (along with concentrated development close to stops and stations) helps to generate the ridership needed to support transit service. For some stations, parking capacity and restrictions may also be a factor. Importantly, as discussed in Chapter 5, future growth in transit ridership faces significant capacity constraints, including the need for expanded trans-Hudson capacity.
- Unpredictable roadway travel and bottleneck congestion are prevalent for auto trips to New York City, especially at bridge and tunnel crossings. This also hampers bus travel. While the exclusive bus lane (XBL) used on Route 495, for example, often produces dramatic time savings for bus trips from the suburbs, the facility is at or near capacity, as is the Port Authority Bus Terminal in New York.

URBAN/DOWNTOWN CONNECTIVITY:

- Rail transit connections are available among and between some of North Jersey's urban areas and denser downtowns that have train stations, but service can be infrequent. Bus service also varies, by route as well as by time and day of the week

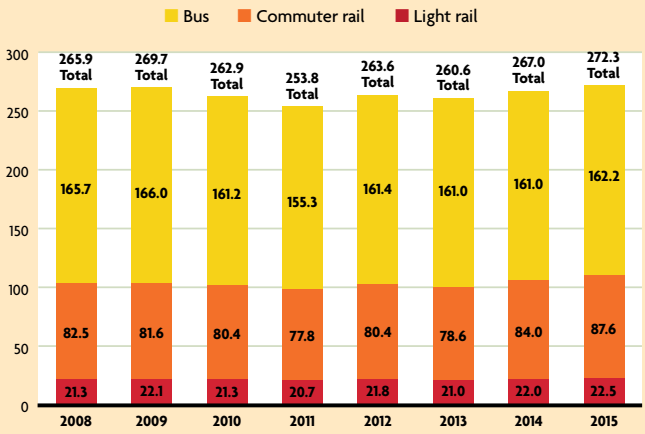
Maps 5 and 6:
Percent Highway Work Trips, ACS 2011–2015

Less than 45 minutes **Less than 60 minutes**



Source: ACS, 2011-2015

Figure 3-6:
NJ TRANSIT Ridership, Fiscal Year Ending June 30 2008 to 2015
(Total annual in millions)



Source: NJ TRANSIT's Annual Reports

(weekday/weekend). Walkability contributes to the attractiveness of using transit in these areas. Bus access to these locations can be slow or infrequent depending on the route and destination.

- While most of these areas are well served by highways and local roads, auto access can be problematic as most roadways experience increased travel times due to unpredictable conditions and bottleneck congestion during peak hours. Automobile circulation in these areas requires active management and must be balanced with the need to accommodate walking and bicycling.

SUBURBAN CONNECTIVITY

- County and municipal roads are important travel routes in the suburbs. Highways often are major economic corridors. In many suburban areas, severe congestion and unpredictable travel times often extend to off-peak hours and weekends, especially in commercial arterial corridors and routes that provide access to seasonal shore and recreational locations.
- Transit access between many suburban areas is available but often limited, with some exceptions during peak hours and along densely populated and commercially well-developed corridors that sustain significant ridership. The ease of auto use and availability of free parking make suburban transit travel less attractive. First/last mile access, particularly via walking, can be challenging in less densely populated places. New on-demand and shared travel services can improve connectivity for such areas.

RURAL CONNECTIVITY

- Transit access in rural areas is limited in terms of coverage and frequency. As in suburban areas, most travel is by auto, which is supported by abundant free parking. Limited population and employment

Game Changer—On-Demand/Shared Travel

A growing number of travelers are hailing rides with smart phones through companies such as Uber and Lyft. The taxi-like services employ thousands of drivers throughout New Jersey, with particular focus on areas along the Hudson River and the Jersey Shore. Among other uses, they are helping bridge the first/last mile gap for accessing transit, and giving mobility options for seniors and the disabled.

At the same time, car-sharing services—similar to car rental but for shorter time periods—are another option gaining traction. And urban areas are implementing bike share programs with growing success. It all points to a future in which many people can travel easily without owning a car, and the landscape devoted to accommodating all those personal vehicles—two-car garages, acres of free parking and urban parking garages—is drastically altered.

SERGIO RUIZ/FLICKR.COM

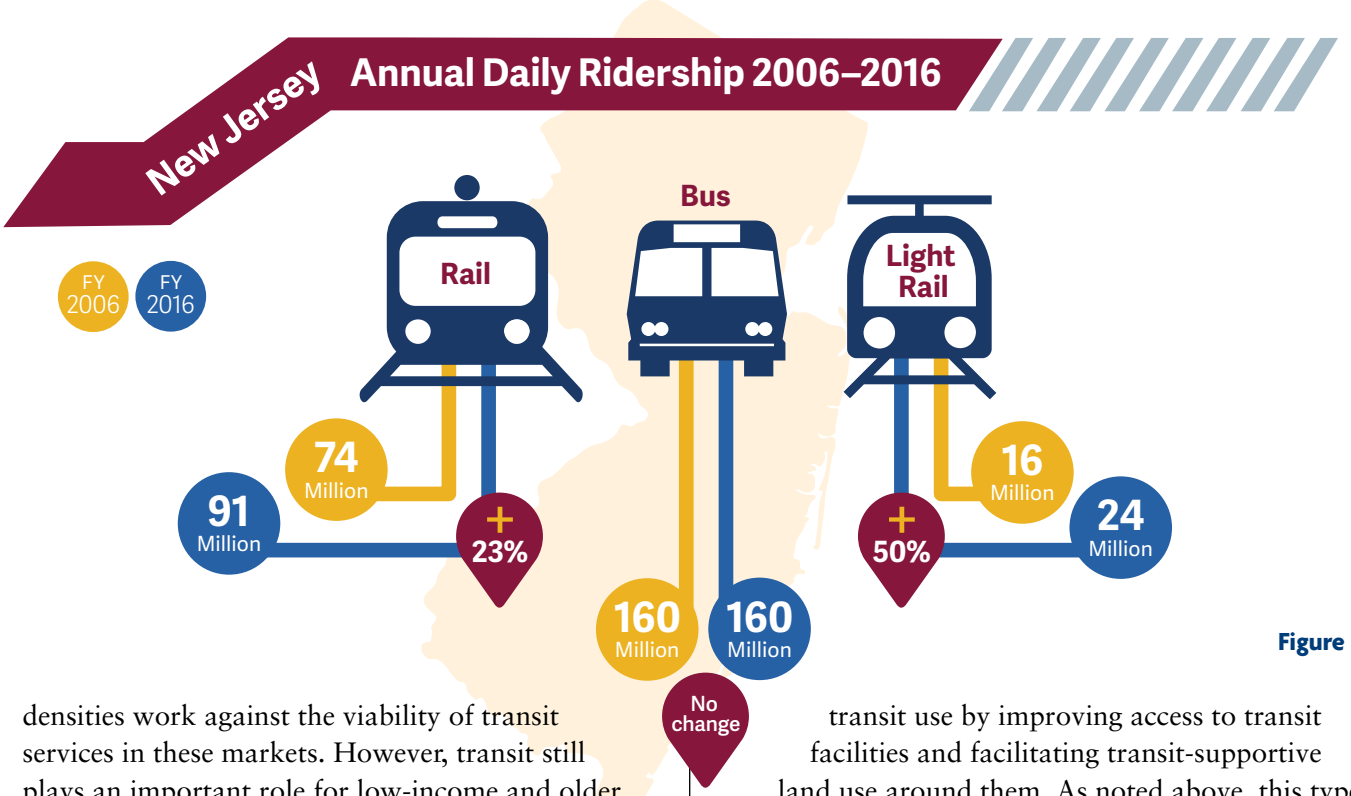


Figure 3-7

densities work against the viability of transit services in these markets. However, transit still plays an important role for low-income and older residents and those with disabilities. On-demand and shared travel services can contribute as well.

- By their nature, rural areas are generally less accessible than other parts of the region. Highway, arterial, county and local roadways provide core travel routes between rural and suburban areas. But as with the rest of the region, unpredictable travel and bottleneck congestion occur both during peak and off-peak hours. The road network serving rural areas tends to have fewer alternative routes than in suburban and urban areas, which can increase travel times and make auto trips less reliable.

Transit

Transit ridership saw an uptick as the economic recovery gained strength. As shown in Figure 3-6, ridership fell 6 percent during the recession, from a high of 269 million passengers in 2008 to 254 million in 2011. In 2015, it rebounded to 272 million—the highest in eight years, mostly due to increases in rail use consistent with the longer trend (Figure 3-7).

While a stronger economy is the main factor in increasing ridership, land use policies are supporting the trend. Ongoing efforts by the NJTPA, NJ TRANSIT and partner agencies—many coordinated through Together North Jersey—are encouraging transit use by improving access to transit facilities and facilitating transit-supportive land use around them. As noted above, this type of development is in high demand by the millennial generation. Overall, systemwide rail ridership is expected to grow by 31 percent by 2045. As discussed elsewhere in this plan, the increase in transit demand raises the need for adequate funding to support long-term transit capital and operating needs while keeping fares affordable.

Funding in particular is needed to expand capacity across the Hudson River (see Trans-Hudson p. 57). The Hudson Tunnel Project initially will allow the shut down and repair of the existing 100-plus-year old tunnels, but also supports the larger Gateway Program that would increase trans-Hudson rail capacity and allow possible rail expansions in North Jersey. Also needed are new or upgraded bus facilities and systems, including the Port Authority Bus Terminal.

Figure 3-8 underscores the importance of the trans-Hudson market for the region. This market accounts for 46 percent of all weekday transit trips in North Jersey and the demand for trans-Hudson travel continues to grow. NJ TRANSIT expects to see 30 percent growth in trans-Hudson rail ridership by 2045. It should be noted that the 17,000 daily light rail riders that are making trans-Hudson trips are crossing the river either using a NJ TRANSIT bus or rail service or PATH service.

Map 7:
NJ Transportation Management Associations (TMAs)

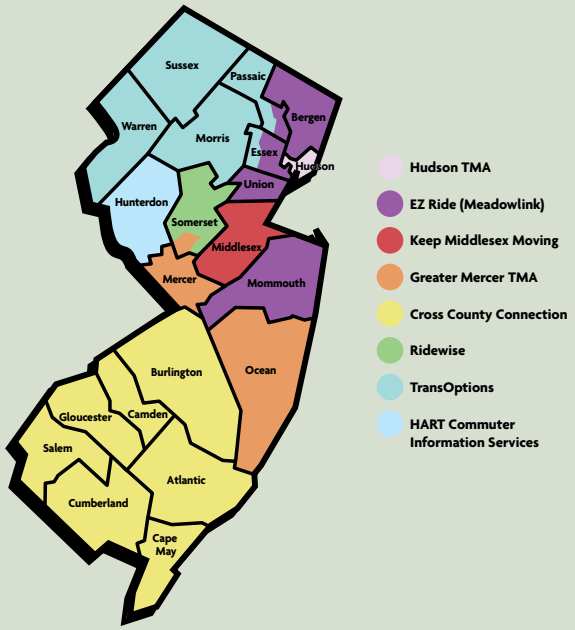
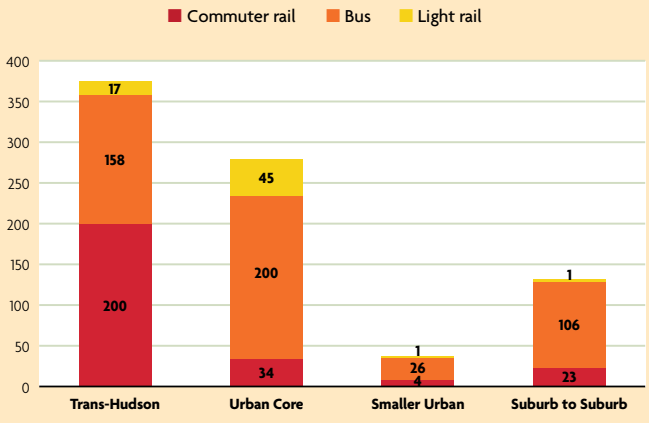


Figure 3-8:
NJ TRANSIT Ridership by Market
(Trips in thousands, average weekday)

% of NJ TRANSIT Riders: Trans-Hudson, 46%; Urban Core, 34%; Smaller Urban, 4%; Suburb to Suburb, 16%



Source: NJ TRANSIT, 2010

NOTE: Trans-Hudson = all travel destined east of the Hudson River; Urban Core = all travel destined to Hudson County, Newark, and Newark Airport; Smaller Urban = all travel destined to Elizabeth, Paterson, Hackensack, New Brunswick and Trenton; Suburb = all remaining travel.

High levels of both residential and employment growth are expected in Hudson County, especially in areas that provide access to employment opportunities both in New York and along the Hudson River waterfront in New Jersey. Accommodating this growth in demand will be a critical component of planning in the coming years for NJ TRANSIT Hudson Bergen Light Rail (HBLR), the PATH system, and NJ TRANSIT and privately-operated bus services.

NJ TRANSIT has and will continue to advance capacity improvement projects to support increased HBLR service, which now serves more than 50,000 daily trips. The PATH system plays an important role in regional and trans-Hudson commuting. It serves about 288,000 trips daily, including 259,000 trans-Hudson trips and about 29,000 intrastate trips within Newark and Hudson County. The PATH system is adding capacity to address robust growth in demand, but this new capacity is projected to be used up by the mid-2020s, primarily due to rapid development around key stations such as Journal Square and Grove Street in Jersey City.

The Port Authority of New York & New Jersey predicts that weekday passenger trips traveling through the Port Authority Bus Terminal could increase from 260,000 in 2015 to 337,000 in 2040. During the morning peak, access to the bus terminal is enhanced by the XBL leading to the Lincoln Tunnel. It is the most efficient highway lane in the country, with 66,000 passengers on 1,850 buses each weekday, including 650 buses in the peak-hour. The infrastructure supporting the critical trans-Hudson bus system has reached capacity, and the bus terminal will require structural replacement within 15 years. Solutions to protect and expand the network serving trans-Hudson bus travel will be vital to the region's economy.

More than half the bus riders to Manhattan come from two counties, Bergen and Hudson. Private bus carriers enhance the availability of bus service to Manhattan, providing more than 37 million annual trips in North Jersey.

In addition, transit is a lifeline for those older adults, veterans, low-income persons and individuals with disabilities who have special transportation needs, as outlined in the NJTPA's Regional Coordinated Human Services Transportation Plan (CHSTP), discussed in Chapter 2 and Chapter 5. The plan, Go Farther, is required to address any special transportation needs of these groups. Suburban and rural parts of Sussex, Warren, Morris, Hunterdon and Ocean counties that are likely to see a growing senior

citizen population are faced with limited rail and bus transit. These older residents will be increasingly reliant on community transportation services provided by county transportation agencies and Transportation Management Associations (TMAs)(Map 7). Ride hailing services such as Uber and Lyft could also play a role.

Ferries are an important supplement to the region's rail and bus services with private operators providing direct service to Manhattan from Hudson, Bergen, and Monmouth counties. Approximately 8.7 million trips were made on ferries in 2016, with 30 percent expected growth by 2045.

Freight

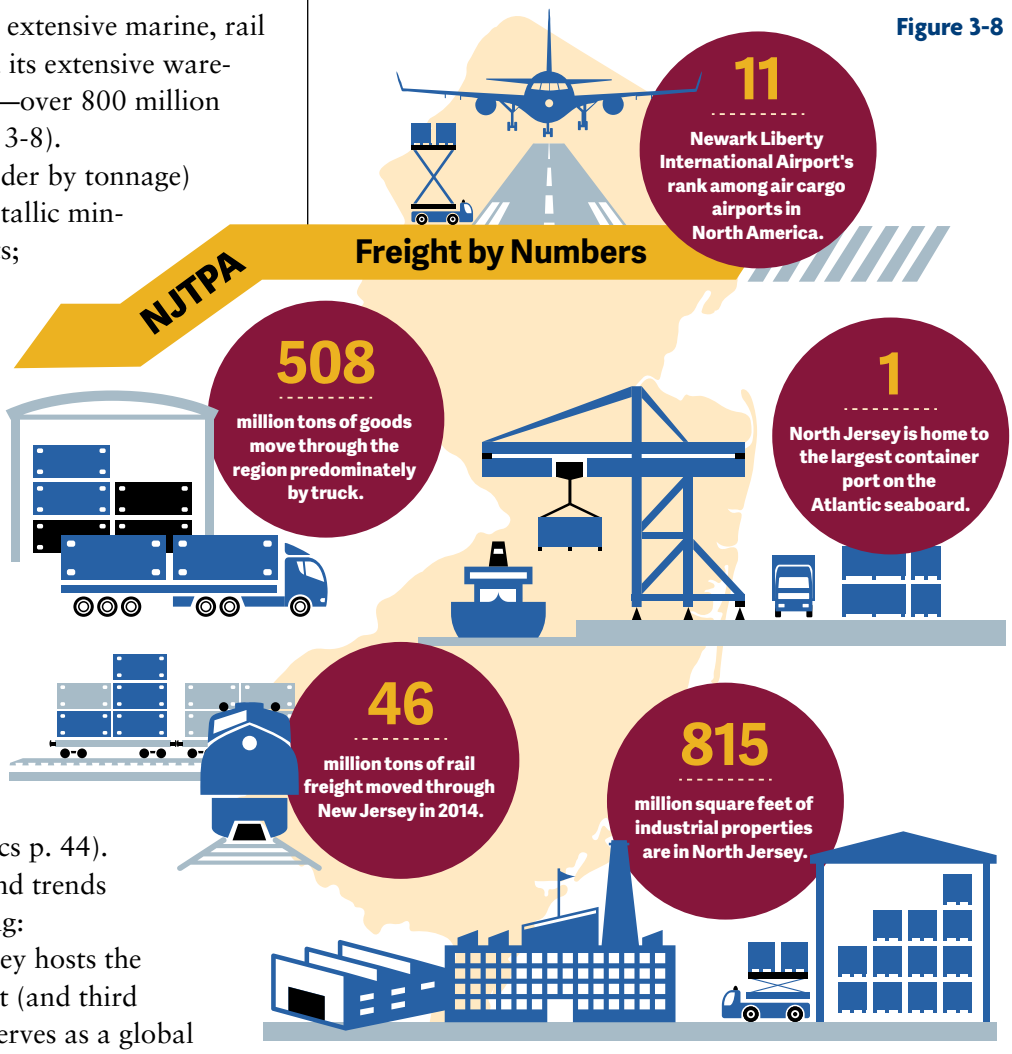
Freight is critical to North Jersey's economy, with about a third of the region's 3 million jobs highly dependent on goods movement. The freight sector's strength is based on the region's location in the center of a major consumer market; its extensive marine, rail and highway infrastructure; and its extensive warehouse and distribution facilities—over 800 million square feet in the region (Figure 3-8).

Commodities handled (in order by tonnage) include consumer goods; nonmetallic minerals; petroleum or coal products; chemicals; clay/concrete/glass/stone; food; and municipal solid waste. The domestic freight handled in North Jersey is projected to grow by more than 40 percent to 719 million tons in 2045.

As this growth occurs, the freight sector will undergo major changes, many of them driven by technology advances including continued expansion of e-commerce, 3D printing and truck platooning (see Game Changer—Freight Logistics p. 44). Among the current challenges and trends affecting freight are the following:

Marine Freight—North Jersey hosts the largest seaport on the East Coast (and third largest in the United States). It serves as a global gateway for imports and exports. Port cargo tonnage increased by 30 percent over the last 10 years, and the number of containers handled increased by 33 percent during the same period. In 2016, the port industry supported 200,350 direct jobs, 344,470 total jobs, $21 billion in personal income, more than $53.8 billion in business income and nearly $7 billion in federal, state and local tax revenues in the state. Port traffic is anticipated to grow at 3 to 5 percent annually. Neo-Panamax vessels, with capacities well in excess of 10,000 twenty-foot equivalent units (TEUs) and ultra-large container vessels with capacities of at least 18,000 TEUs, are anticipated to increasingly call on the port with the completion of the Panama Canal expansion, increased use of the Suez Canal and the 2017 completion of work to raise the Bayonne Bridge. The increase in containers being handled at one time with these larger vessels will require enhanced terminal

Figure 3-8



Game Changer—Freight Logistics

The way freight moves throughout our region will be transformed by technological changes, shifts in consumer habits and other factors. Among the issues that must be considered in planning for the future of freight:

Truck Platooning—Tests are underway on systems to allow trucks to travel in closely spaced platoons, increasing efficiency and conserving fuel. The technology could one day mean driverless trucks. Other software allows truckers to find freight along their route, so they fill as much of their cargo space as possible, reducing the number of mostly empty vehicles on the road.

Changing Retail—E-commerce has put some brick and mortar stores out of business and forced others to shift to meet the demands of a growing online consumer base. This means more delivery trucks on the road. And companies are opening smaller warehouse operations closer to consumers in order to meet shipping demands.

JEREMY VANDEL/FLICKR.COM

Delivery Drones—Some companies are testing drones as a delivery method. Others, like UPS, have turned to delivery bikes or storage lockers where customers can pick up items. These methods will have to be considered in policy changes as some communities have moved to restrict truck traffic and warehouse hours of operation.

3-D Printing—This emerging technology could revolutionize supply chains. Companies will no longer have to rely on parts suppliers in far off places. They can manufacture their own parts or buy them from local firms or regional facilities specializing in custom products.

operations, as well as new strategies and investments for accommodating the additional truck, rail freight and domestic waterborne movements.

Rail Freight—Rail yards in the region not only directly serve the port, Bayway Refinery and other area businesses, they are also end points for rail lines carrying large volumes of consumer and other goods from across the country. Rail freight traffic has undergone significant swings with periods of increased movement of petrochemicals and containers and reductions in shipments such as coal.

Nevertheless, most of the major freight rail lines in North Jersey, including the Lehigh Line and the River Line, will be at or over capacity by 2045.

Trucking—Nearly all goods moved in the region travel by truck for at least part of their journey, especially short haul and time-sensitive deliveries. In all, more than 80 percent of domestic freight traveling to, from or within North Jersey moves by truck. Congestion over key highways and at ports and terminals hampers timely freight movements. As discussed elsewhere in this plan, the industry also faces driver shortages and a lack of parking.

Air Freight—While air cargo tonnage had been declining as more freight was moved by land and sea, Newark Liberty International Airport has experienced a consistent year-over-year uptick in tonnage growth since 2013. The airport is a major domestic and international hub for express carriers, as well as an important market for domestic and international commercial carriers, including a major hub for United Airlines. In 2016, the airport handled 746,800 tons of air freight

and 45,800 tons of air mail. The airport ranked 11th nationally and 37th internationally in air freight activity. With air cargo tonnage levels remaining consistently strong, this mode continues to represent a key means for moving time sensitive and extremely high value goods.

Safety Trends

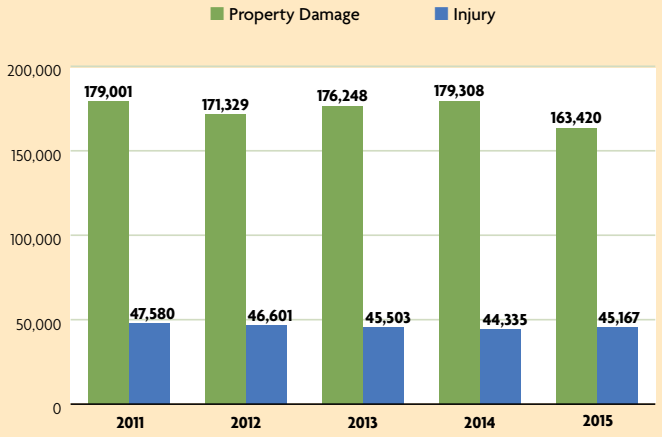
Improving safety is a top priority at the NJTPA and is factored into all aspects of transportation investment decision-making. Each year, there are more than 200,000 motor vehicle crashes in North Jersey, resulting in more than 300 fatalities and 40,000 injuries. It is important to note that the number of crashes has steadily declined—with the exception of an uptick in 2014—despite the fact that the region's population and VMT have grown.

The NJTPA works in partnership with NJDOT, NJ TRANSIT, the New Jersey Turnpike Authority, the Port Authority, and the New Jersey Division of Highway Traffic Safety, as well as with engineers, planners, local elected officials, New Jersey's other metropolitan planning organizations and various stakeholders to improve safety on the region's multimodal transportation system.

Investment in safety improvements and policy direction for road safety is guided by the statewide Strategic Highway Safety Plan adopted in 2015 to meet federal requirements. New Jersey has adopted "Towards Zero Deaths" as a goal of eliminating fatalities. Chapter 5 outlines the many strategies being pursued towards this goal. Among the plan's emphasis areas are reducing lane departures, intersection crashes, drowsy and distracted driving, crashes involving drivers over the age of 65, aggressive or impaired driving and protecting bicyclists and pedestrians.

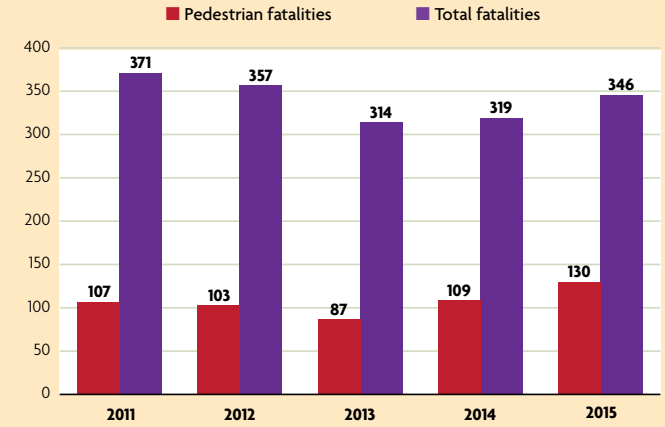
Figures 3-9 through 3-11 below illustrate regional safety trends. The crash rate has mostly declined from 2011 to 2015, mirroring what is happening at both the state and national level. Pedestrian injury crashes in the region steadily decreased between 2011 and 2015. Fatal crashes have also been on the decline since 2011, though there was an uptick in 2015. Pedestrian fatalities, however, have fluctuated during the same period—with an increase in 2014 and 2015—an issue which has prompted more focus on identifying and addressing potential contributing circumstances such

Figure 3-9:
NJTPA Crashes 2011–2015



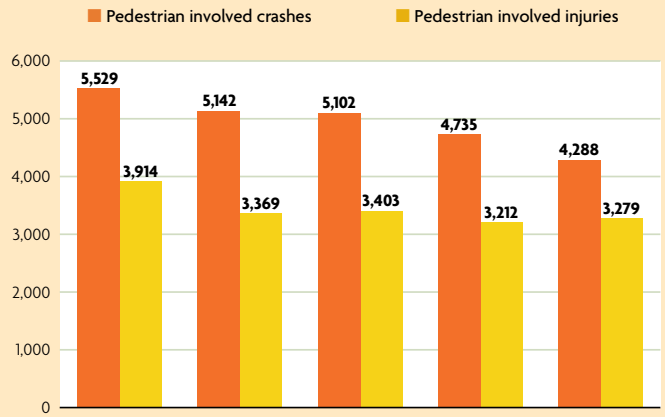
Source: NJDOT Data Warehouse

Figure 3-10:
2011–2015 NJTPA Regional Fatal Crashes



Source: NJDOT Data Warehouse

Figure 3-11:
2011–2015 NJTPA Region
Pedestrian Involved Crashes and Injuries



Source: NJDOT Data Warehouse

as driver or pedestrian distraction.

Crash statistics indicate that the most vulnerable travelers—pedestrians and bicycle riders—are disproportionately at risk. Targeted safety investments have improved pedestrian safety, but there is more to be done. Of the region's 346 crash-related deaths in 2015, more than 35 percent were pedestrians, although walking accounts for about 9 percent of all trips. The uptick in 2014 and 2015 points to the urgent need to address the causes in pedestrian and cyclist fatalities. Working toward zero deaths remains a top priority of the NJTPA's safety improvement work.

In response to the FHWA designation of Newark as a focus city and New Jersey as a focus state, the NJTPA developed Street Smart NJ, a pedestrian safety education campaign launched in 2013 in cooperation with NJDOT and the New Jersey Division of Highway Traffic Safety. Since the initial pilot in five communities, the program has grown annually to now include more than 60 municipalities (see Street Smart NJ p. 95).

Analysis of regional crashes identifies many contributing factors, including age, impaired driving, distracted driving, lighting, vehicle speed and road design. Continued partnerships with NJDHTS, the subregions, other government agencies and traffic safety related organizations is crucial to improving safety through 2045, coupled with investment in proven safety countermeasures at priority locations.

Aftermath of Superstorm Sandy, Belmar, Monmouth County

Game Changer—Weather, Cyber, and Other Threats

Superstorm Sandy and the events of September 11, 2001 have given people in the region first-hand experience with the importance of preparing for potentially catastrophic events. For the future, the possibility of increased extreme weather due to climate change, rising sea levels along the region's extensive coastal areas and cyber threats are particular concerns.

This plan calls for building resilience into all future and ongoing transportation investments and programs to prevent and minimize impacts and aid in recovery. This includes improved coordination on security issues among agencies at the state, regional and local levels and contingency planning for events.

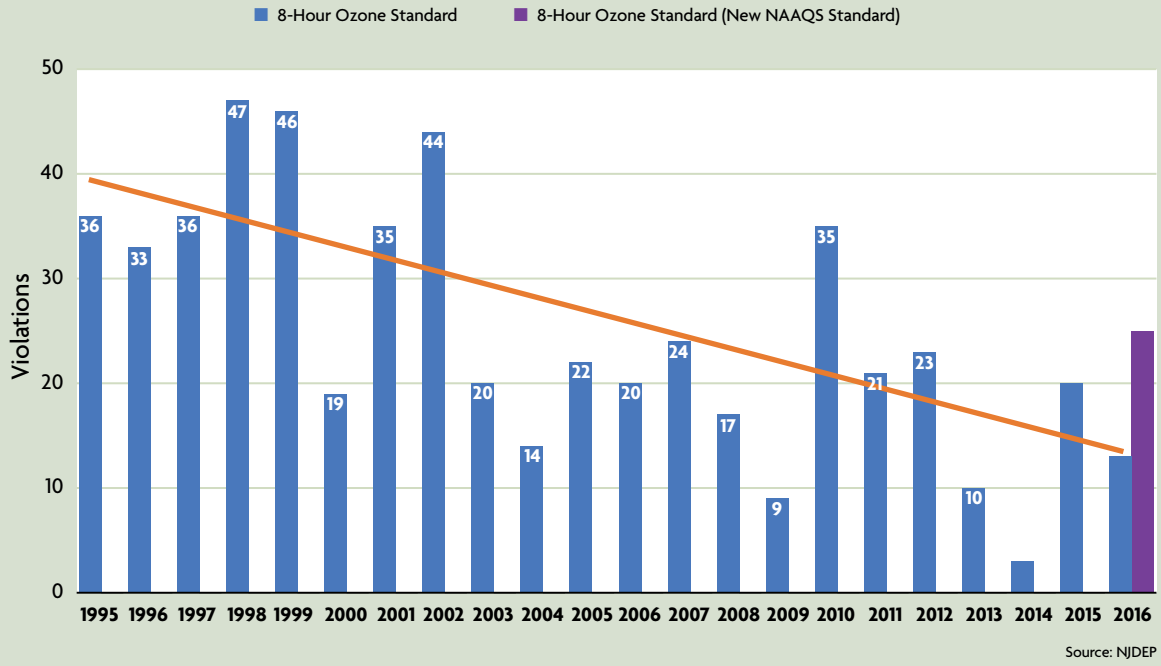
Air Quality

Transportation is a major source of air pollution, which can exacerbate asthma and other serious health conditions. Many factors affect the level of pollution, including the number of car and truck trips, trip length, time spent idling in congestion, vehicle technology and more.

Portions of the NJTPA region continue to suffer from unhealthy air quality. The NJTPA is charged with using its plans and programs to help the state meet federal standards and improve air quality, and the agency is making strides to reach these goals. To demonstrate conformity with the goals, the NJTPA uses computer modeling to estimate the emissions impacts of approved projects.

Parts of the NJTPA region are in nonattainment for failing to meet standards for ozone. But in recent years, parts of the region previously in nonattainment for fine particulate matter (PM 2.5) have advanced to an initial 10-year maintenance designation for meeting the standards. These standards must be met for 20 years to reach a designation of attainment. In addition, areas previously in the initial 10-year maintenance phase for carbon (CO) have advanced to the

Figure 3-12: Annual Violations of the 8-Hour Ozone Standard in New Jersey



Source: NJDEP

final 10-year maintenance phase. When these maintenance phases are completed, the region will advance to attainment for both PM2.5 and CO.

As seen in Figure 3-12, there has been an overall reduction in air pollution in recent decades, including from transportation. While ozone days have steadily declined, it must be noted that in 2016, the federal Environmental Protection Agency (EPA) revised its air quality standards, which increased the number of ozone days from 13 under the old standard to 25 under the new standard.

Changes in technology have made vehicles cleaner, and the use of public transit and shared rides have helped to reduce emissions. The NJTPA, through its funding programs, investments and partnerships in Together North Jersey supports continued air quality progress. One example is NJTPA's Transportation Clean Air Measures program (see Chapter 5), funded with federal Congestion Mitigation and Air Quality dollars, which focuses on projects that reduce emissions.

4

Scenarios & Inves

Little Falls, Passaic County

The assessment of trends described in the previous chapter sets the stage for how the NJTPA faces decisions that can shape the region's future. This plan anticipates substantial growth in population and employment over the coming decades, but also recognizes that unknown opportunities and challenges will arise along the way. In response, this chapter presents policy guidance for transportation investments in the form of an updated Regional Capital Investment Strategy (RCIS), a statement of principles and guidelines, along with desired spending allocations for different types of transportation projects. ● The RCIS

tment Priorities

is performance-based, meaning that it considers desired outcomes for the region's future. Regional outcomes will depend on many factors, including funding levels and how funding is allocated for investments. To update the RCIS, the NJTPA formulated scenarios and assessed their ramifications. This drew upon the results of technical analysis and modeling and consultations with NJTPA Board members, subregional staff, planners, engineers, stakeholders, researchers and others at various forums and workshops. The updated RCIS also reflects input gathered through the extensive public outreach (chapter 2) and draws upon NJTPA's work with partners in preparing and implementing the Together North Jersey plan. Ultimately, the RCIS reflects the NJTPA Board of Trustees' policy directions and choices for transportation investment.

Guttenberg, Hudson County

The RCIS consists of 12 principles (right) and associated guidelines (plan addendum) which set the overall direction for NJTPA investments over the long term. The principles are translated into more specific strategies and actions, as presented in Chapter 5, for addressing transportation needs on various modes and facilities in the region. The RCIS desired outcomes and associated performance measures inform planning. Related criteria are used to prioritize funding for proposed projects (through the NJTPA Project Prioritization process). These uses of the RCIS ensure a consistent performance based and asset management approach to transportation investments.

The RCIS provides the foundation for charting the region's future amid the "game-changers" discussed in Chapter 3 as well as fiscal uncertainties. Four exploratory scenarios were identified and analyzed for outcomes tied to the *Plan 2045* vision of a **Competitive**, **Efficient**, **Livable** and **Resilient**, region. While funding issues are dealt with in detail in Chapter 6, three funding scenarios are also discussed in this chapter—Plan 2045 (reasonably anticipated), limited, and aspirational—showing how different funding levels would meet regional needs, in keeping with the RCIS principles. This chapter also addresses performance measures, which are used to assess impacts of investments and will be used to set targets for how well the transportation system functions and is maintained.

Scenarios and Updating the RCIS

The RCIS was first created in 2005 and is modified as part of updates to the NJTPA Regional Transportation Plan every four years. The key elements of the RCIS have remained largely unchanged. In particular, the *Fix it First* principle continues to drive most NJTPA investments and receives the largest share of funding—73 percent—which is devoted to maintenance and preservation categories. As discussed later in this chapter, this and other allocations have been adjusted based on current and historical investment levels. Despite the general continuity of most elements of the RCIS, modifications must be made to meet changing conditions and needs.

In preparing an updated RCIS for *Plan 2045*, it was important to consider not only underlying population and demographic trends, but also uncertainties and possible developments that could affect the region (as discussed in Chapter 3). Based on the themes and topics repeatedly raised in outreach events, forums, and workshops conducted for Plan 2045,

Regional Capital Investment Strategy (RCIS) Principles

Each principle is further refined with guidelines (listed in addendum).

Help Northern New Jersey Grow Wisely Transportation investments should encourage economic growth while protecting the environment and minimizing sprawl in accordance with the State Development and Redevelopment Plan, Energy Master Plan, and Greenhouse Gas Plan.

Make Travel Safer Improving safety and security should be explicitly incorporated in the planning, design and implementation of all investments.

Fix it First The existing transportation system requires large expenditures for maintenance, preservation, and repair, and its stewardship should be the region's highest priority.

Expand Public Transit Investment to improve the region's extensive transit network should be a high priority, including strategic expansions to increase capacity and to serve new markets.

Improve Roads but Add Few Road investments should focus on making the existing system work better, and road expansion should be very limited without compromising the tremendous accessibility provided by the existing highway system.

Move Freight More Efficiently Investments should be made to improve the efficiency of goods movement because of its importance to the region's economy and quality of life.

Manage Incidents and Apply Transportation Technology Investments should be made to transportation systems management and operations to improve information flow, operational coordination, energy use, and other technological advances that can make the transportation system work smarter and more efficiently.

Support Walking and Bicycling All transportation projects should promote walking and bicycling wherever possible.

Increase Regional Resiliency Investments should be made to mitigate risks associated with sea level rise, extreme weather, homeland security, and other potential threats. Investments should consider criticality of infrastructure, vulnerability, and level of risk.

Fort Lee, Bergen County

Bayonne Bridge, Hudson County

four exploratory scenarios were assessed: Regional Challenges (including resiliency), Communities Focus (including community design, development patterns, walking, biking and transit access), High Technology (including automation, energy and information technology) and Economic Opportunities (including those identified in the NJTPA's North Jersey Comprehensive Economic Development Strategy and investments in public transit capacity and roadway reliability). Each was the subject of computer modeling and qualitative analysis to assess possible impacts of different possible futures. The following summarizes updates to the RCIS based on consideration of these scenarios:

REGIONAL CHALLENGES

Heeding the lessons of Superstorm Sandy, Hurricane Irene and the 9/11 tragedy before it—as well as national examples of hurricanes Katrina and Harvey—the NJTPA must bolster efforts to help the region prepare for unforeseen and potentially catastrophic events. During outreach for this plan, people in the region repeatedly expressed concern that their communities needed to do more to prepare for a repeat of Sandy or similar threats. Above all, public agencies including the NJTPA must help preserve and maintain the functioning of the transportation system and the well-being of the region's residents. Challenges may arise from increased extreme weather due to climate change, rising sea levels, or malicious physical or cyber-attacks.

In response—and following direction of the NJTPA Board of Trustees—a new investment principle has been added to the RCIS, *Increase Regional Resiliency* (see page 51).

A number of guidelines were added relating to this principle including calling for improving system redundancy and incorporating vulnerability and risk assessments into project development. This applies to system preservation as well as system upgrades and expansion. Also in keeping with this principle, *Plan 2045* advances strategies for mitigating the impacts of extreme weather and improving the environment through clean air programs and alternate fuel technologies, as discussed in Chapter 5.

Investments in resiliency, in addition to upgrading infrastructure in preparation for extreme events, should improve day-to-day travel reliability by offering more route and mode options. Cleaner air and alternate fuels should be associated with health, quality-of-life and energy efficiency benefits.

Even with increased resiliency investments, coastal storm surge with sea level rise could seriously threaten population and infrastructure. Agencies at all levels of government will continue to grapple with investments in places highly vulnerable to potential coastal or riverine flooding. Individuals and businesses will consider these challenges in deciding where to locate or develop properties. Both the public and private sector must engage in asset-based planning to manage these future challenges. For some communities in vulnerable locations, issues of equity and environment justice must be considered.

COMMUNITIES FOCUS

The changing demographic trends described in Chapter 3 include shifts in preferences and needs of different segments of the population, which favor the urban core and more densely populated centers around the region, where walking, biking and transit are viable travel options. This includes millennials seeking out walkable neighborhoods with less need for driving; an aging population with seniors in need of improved access to essential services; and employers looking for creative, collaborative environments and to attract the new generation of workers.

The NJTPA and its partners support the growth and development of places that meet these needs, including through Transit Supportive Development focused on the region's many older downtowns already served by bus and rail and towns planning new development that could support future transit services. Based on outreach for this plan, much of the public are enthusiastic about this type of development in their communities. This support is reflected in the RCIS principles of *Help the Region Grow Wisely, Support Walking and Biking, and Expand Transit*. It also fits with key objectives of the Together North Jersey plan, in particular its livability theme. To reference recent initiatives in this area, language was added to the RCIS guidelines on the importance of Complete Streets, recreation, open space and the arts in community development.

Benefits of these types of investments should include reduced driving, along with associated

Roxbury, Morris County

reductions in transportation-related fatalities, injuries and air pollution. Positive health outcomes should also emerge from more physical activity, walking and biking.

TECHNOLOGY

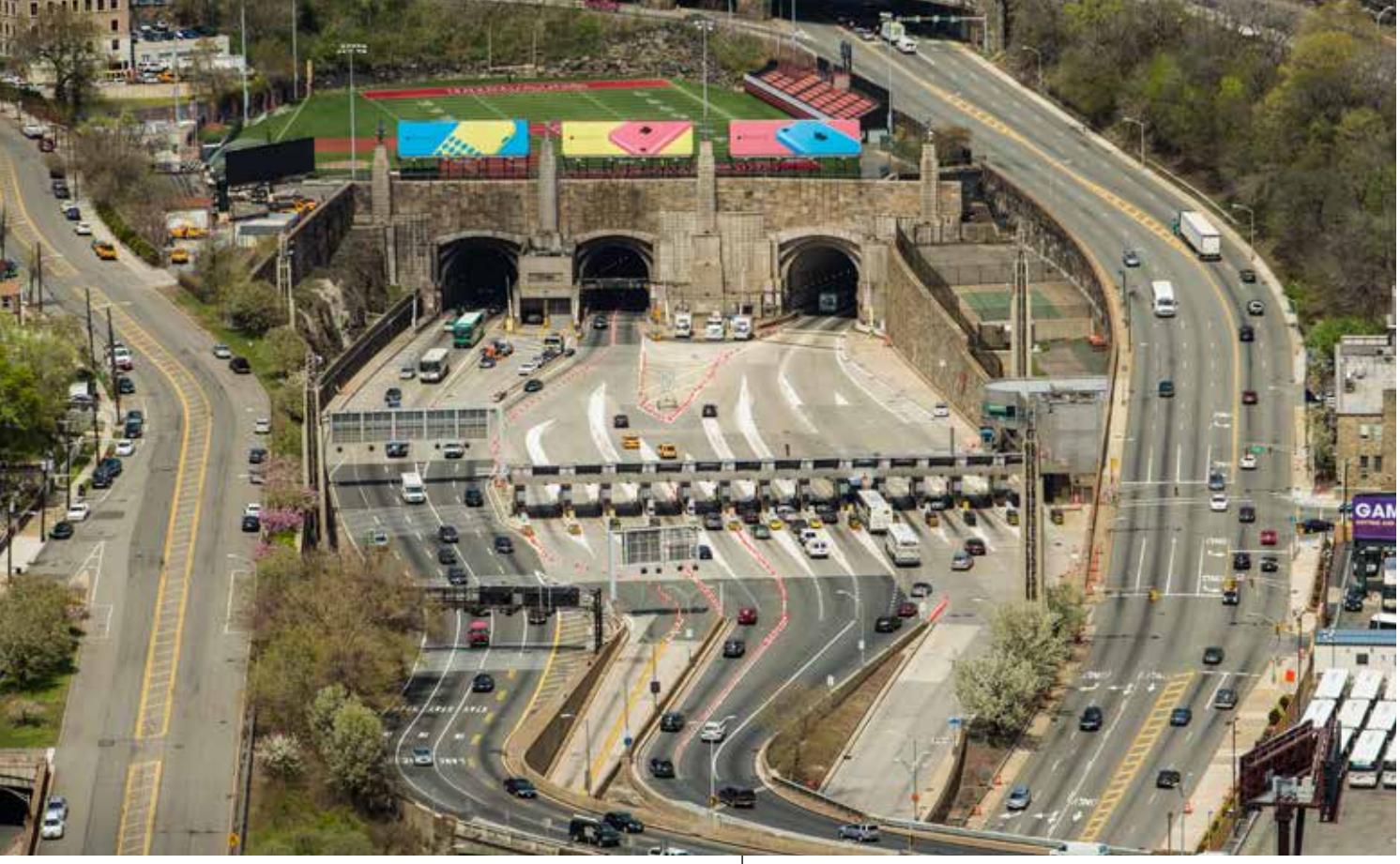
The march of technology advancement is unrelenting. NJTPA planning programs and studies continue to explore technology's potential not only to produce a more efficient transportation system but also to support broader regional goals in innovative ways. Future technology may include any or all of the developments noted in Chapter 3—autonomous cars, 3-D printing, responsive signal systems—or, as likely, features that are yet to be imagined.

Scenario analysis of a "high tech" future pointed to the potential of technology for maximizing the use of existing infrastructure, creating a more reliable system across travel modes. Public input to this plan was broadly supportive of such technologies that can reduce congestion, provide users (roadway, transit and freight) with more real-time information, lessen capital outlays on projects and reduce reliance on cars. But many people were wary of costs and negative impacts, particularly of autonomous vehicles, with some people questioning their safety and whether they would make congestion and air quality worse by putting more cars on the road. Transportation experts cautioned that technology developments must be carefully managed to ensure they serve the public and stressed the need for cooperation among government agencies and the private sector. Resiliency of new technology infrastructure will also be an issue as its operation will need to be preserved and maintained.

To address these and related issues, a number of modifications and additions were made to the *Manage Incidents and Apply Transportation Technology* RCIS principle and associated guidelines. This includes language emphasizing the need for cooperative planning and coordination, the need to assess and avoid unwanted impacts and ensuring support for public transit and the environment.

ECONOMIC OPPORTUNITIES

As discussed in Chapter 3, the region's economy and prosperity are closely tied to the effective functioning of the transportation system. The capacity of the system to support growth and economic activity is critical. To this end, NJTPA planning activities, particularly as part of Together North Jersey, support



Weehawken, Hudson County

better coordinating transportation investments and economic development throughout the region. One notable effort, touching on all RCIS principles, was the development of the North Jersey Comprehensive Economic Development Strategy (CEDS) in cooperation with local governments (see p. 14). The importance of implementing CEDS recommendations was added to the RCIS, noting the need for "special attention to facilitating access to jobs for all residents and communities."

At the regional level, investments guided by the RCIS principles should result in continued economic progress. The project index includes a host of major highway, bridge and transit improvements. Language was added to the RCIS calling for streamlining of project delivery to ensure these projects are delivered in a timely manner and make cost effective use of available funding.

Public transit capacity is a crucial element of supporting the region's economic attractiveness. While comments from the public generally favored communities with more travel options, many residents outside of the urban core expressed frustration with the lack of transit (especially rail) options and the difficulty of accessing the transit system. Creating new rail services, however, will depend on addressing the bottleneck in rail capacity crossing the Hudson River. The RCIS supports the Hudson Tunnel Project, which will maintain capacity while repairs are made to the old tunnels. Language was also added calling for "new capacity for expanded service," which is part of the larger Gateway program (see page 58). (Note, however, that funding for these large transit projects will need to be identified outside of NJ's typical funding sources, and therefore is not reflected in the allocation objectives contained in the RCIS.)

The RCIS was also updated to acknowledge the role of region's Transportation Management Associations whose coordination of programs such as shuttle buses and employer subsidized travel services can facilitate access to transit and provide travel alternatives, including carpooling, particularly in the suburbs.

Also of importance for the regional economy is attending to needs on the road network, both for people and goods. *Under the Improve Roads but Add Few* principle, a guideline was modified to call for using "the NJTPA congestion management process and context-sensitive criteria to target roadway investments that improve travel time reliability and address

bottlenecks and hotspots." To implement this guideline, Chapter 5 includes numerous proposed strategies for the road network including Complete Streets. Additional references were added to the RCIS regarding the importance of improving the region's freight system including connectivity of roadway, freight rail and waterborne facilities—critical supports for the regional economy.

The range of factors discussed for other scenarios should support the region's economic prosperity, with benefits throughout the region's communities. Increased resiliency, stronger communities, and smart application of technology should all serve to make northern New Jersey more competitive.

RCIS Allocation Objectives

The long-term RCIS allocation objectives (Table 4.1) describe as a percentage how funding should be allotted to the various categories of transportation projects over time. The process of formulating and assigning new allocation objectives took into account specific NJTPA Board of Trustees preferences, historical programming expenditures in the transportation improvement programs (TIPs), currently programmed expenditures, and the scenario analysis discussed above. Transportation investment according to the RCIS should help the region achieve its favored outcomes.

The allocation objectives are not intended to dictate year-to-year spending, but to provide a general guide over the life of Plan 2045. The objectives largely mirror current spending patterns (with some adjustments for emerging priorities), thus looking forward while also reinforcing past NJTPA investment decisions. The allocation objectives exclude special large-scale investments such as the Gateway Program (including the Hudson Tunnel Project and Portal Bridge North) for which dedicated funding should be sought.

As noted, the RCIS provides for the majority of funding to be allocated toward maintaining, preserving, and hardening the existing transportation network, but the investment strategy also builds upon the region's commitment to expanding transit, improving safety, enhancing transportation efficiency, optimizing the system, improving freight facilities, augmenting bicycle and pedestrian travel, increasing regional resiliency, and encouraging sustainable growth and prosperity. Below is a summary of the allocations by category. It is important to recognize that the investment strategy allocations described are long-term objectives.

- *Maintenance and preservation for roads, bridges, and public transit facilities*—73 percent of total investment. The intention is to invest more in the near term in order to bring the system to a sustainable state of good repair, allowing for relatively lower future needs.
- *Investment in enhancing and expanding public transit*—8 percent. This level recognizes the limited opportunities for significant expansions to the existing robust transit network; it does not include additional dedicated funding as noted above.
- *Investment in road enhancements*—3 percent. This includes physical upgrades, such as adding turning lanes or renovating intersections. Technology, incident management, safety and pedestrian/bicycle investments will improve road operations as well.

Table 4.1:
Plan 2045 RCIS Allocation Objectives

Category of Investment	Objective
Bridges	20%
Road Preservation	17%
Road Enhancement	3%
Road Expansion	1%
Subtotal: Roads & Bridges	**41%**
Transit Preservation	36%
Transit Enhancement	4%
Transit Expansion	4%
Subtotal: Transit	**44%**
Dedicated Freight	3%
Direct ITS	4%
TDM	2%
Direct Safety	4%
Direct Bike/Ped	2%
Subtotal: Other	**15%**
TOTAL	**100%**
Other Subtotals	
Preservation†	73%
Direct ITS, Safety, Bike/Ped	10%

†Bridges, Road Preservation, and Transit Preservation

- *Investment in roadway expansion*-—1 percent. This recognizes that more cost-effective benefits are to be found from other types of improvements.
- *Investment in direct safety improvements*—4 percent. In addition to this direct investment, safety is a priority to incorporate in all investments.
- *Investment in dedicated freight facilities*—3 percent. This focuses on improving connections for serving critical markets and optimizing the system. Other roadway investments will benefit freight movement as well.
- *Investment in intelligent transportation systems (transportation technology) and incident management projects*—4 percent. This supports the potential for major advances in technology while also including these elements appropriately in other types of projects.
- *Investment in bicycle and pedestrian facilities*—2 percent. In addition to these investments, non-motorized elements will be incorporated in other types of projects.
- *Investment in reducing motor vehicle trips with Transportation Demand Management*—2 percent. This includes funding for programs supporting efforts to reduce vehicle trips, such as through NJ's transportation management agencies (TMAs).

Lakewood, Ocean County

Funding Scenarios

The recommended mix of investments in the RCIS is intended to provide a host of regional benefits: support for the economy; stronger community centers; better health through increased walking and biking; increased traveler satisfaction through transportation choices and better information flow; greater resilience to natural and human-caused challenges; and a cleaner environment. But much will depend on the level of funding available.

To assess potential outcomes and provide the foundation for the financing element of *Plan 2045*, three distinct funding scenarios were analyzed:

- Plan 2045 (Reasonably Anticipated Funding) Scenario
- Limited Funding Scenario
- Aspirational Funding Scenario

How these funding levels were arrived at and their relation to meeting the federal requirement for fiscal constraint is addressed in Chapter 6. Briefly, the Plan 2045 scenario will provide a sound fiscal basis for planning future investments over the next 28 years; the Limited Funding Scenario would provide a smaller amount, making it more challenging to maintain current system performance and meet increasing travel demands; and the Aspirational Scenario would provide for additional investments such as expansion of rail capacity with the Gateway program of trans-Hudson transit expansion (and the intrastate transit options that the Gateway program enables) that would provide vital support for regional progress.

The Plan 2045 scenario would likely lead to a continued high level of accessibility for the region's travelers and goods movement, although without an increase in trans-Hudson capacity, congestion and crowding on the transit and roadway systems are to be expected. It is anticipated that the focus on investing in preservation will allow the existing infrastructure to be brought to a state of good repair, reducing future costs. Qualitatively, expected outcomes in the different scenarios track with funding levels, affirming the value of transportation investments in fostering desired outcomes.

Asbury Park, Monmouth County

Performance Measures and Performance-Based Planning

The NJTPA has long practiced performance based planning in which the performance of the transportation system is monitored and assessed to see how well policies, projects and programs are accomplishing what they are intended to. Performance measures offer information on the region's challenges and opportunities to decision-makers, planning partners, and the public. Performance measures such as travel time, transit ridership and vehicle miles traveled are cited throughout Plan 2045 and are used in a variety of contexts in the NJTPA planning process. Studies sponsored and conducted by the NJTPA provide assessments of current conditions using measures and indicators. The region's Congestion Management Process (see Appendix) applies measures to identify transportation needs and to recommend improvements for various modes. In scenario planning for the RCIS and other forward-looking analyses, performance outcomes are estimated through study and computer simulations. In prioritizing projects to be programmed for funding, performance measures serve as criteria to score and compare project benefits.

Performance-based planning is a growing federal emphasis area. New federal regulations are beginning to require states and MPOs to use established national measures. The measures concern transportation safety (on roadways and public transit); state-of-good-repair of infrastructure (roads, bridges, public transit); and system performance (including reliability, freight movement, traffic congestion, and air pollution). The NJTPA is engaged in setting regional targets and supporting state targets in these areas.

Given constrained resources, these and other performance-based planning efforts are critical for helping decision-makers weigh competing priorities and giving the public assurances that funds are being spent cost-effectively to meet regional needs. They will be important tools for implementing Plan 2045.

Trans-Hudson Travel

The Hudson River rail tunnels are in desperate need of repair. Built more than a century ago, the tunnels sustained damage during Superstorm Sandy and are reaching the end of their life expectancy.

Shutting down one tube for repairs would reduce passenger rail capacity by as much as 75 percent. At the same time, demand is expected to grow. Transportation agencies throughout the region recognize the need to upgrade existing transit systems and add trans-Hudson capacity to meet demands. The NJTPA is committed to working with partner agencies to address this critical need and has made trans-Hudson improvements a top long-term priority, referenced in the RCIS.

Several planning initiatives are underway to increase rail access across the Hudson River. The Hudson Tunnel Project, a partnership among NJ TRANSIT, Amtrak and the Port Authority, would add a new rail tunnel and rehabilitate the existing North River Tunnel. The tunnel project is undergoing an environmental review process, which is being led by NJ TRANSIT, Amtrak and the Federal Railroad Administration, that is expected to be completed in 2018. Funding sources to complete the project have not yet been identified.

AMTRAK

The new tunnel supports the larger Gateway Program being led by Amtrak, a long-term plan to improve rail service along the Northeast Corridor. In addition to the tunnel, Gateway calls for expanding New York Penn Station for passengers and trains, new rail storage capacity in New Jersey, replacing the Portal Bridge over the Hackensack River and installation of the Bergen Loop, additional track that would allow for one-seat rides to Manhattan on NJ TRANSIT's Pascack Valley and Main-Bergen lines.

The Federal Railroad Administration is overseeing a companion effort, NEC Future (see sidebar).

The Port Authority has several infrastructure efforts underway, including planning and environmental review to replace the Port Authority Bus Terminal, which is approaching the end of its useful life by 2030. The Authority's Board of Commissioners allocated $3.5 billion toward the project in its 10-year capital plan approved in 2017. The capital plan also included extending PATH service to the Rail Link Station at Newark Liberty International Airport, connecting to the World Trade Center hub in lower Manhattan and augmenting transit options for commuters and local residents.

The agency is also exploring emerging technologies including connected and automated vehicles to increase the capacity of the exclusive bus lane at the Lincoln Tunnel, the busiest bus lane in the country. A recent Port Authority study also suggests coping with growing trans-Hudson demand by exploring expanded bus service at other crossings, targeted expansion of commuter ferries and investments in PATH capacity.

It is anticipated that as these initiatives progress, an effort to form a workable partnership of the right stakeholders will be initiated to fund and advance the implementation of one or more of these projects over the coming years.

Rail Investment Plan for the Northeast Corridor

PLANS ARE UNDERWAY to make improvements to the Northeast Corridor, from Washington, D.C. to Boston, MA, that would keep the rail corridor in a state of good repair and support growth in intercity and commuter rail service.

The Federal Railroad Administration (FRA) released a Record of Decision in July 2017, choosing a selected alternative for the NEC Future investment program. The decision does not approve construction, but provides a framework, allowing individual environmental and engineering project studies to move forward. The timing of these projects will depend on a number of factors, including decisions by the railroads that operate along the corridor and Northeast states, the availability of funding, market conditions, and practical operating constraints.

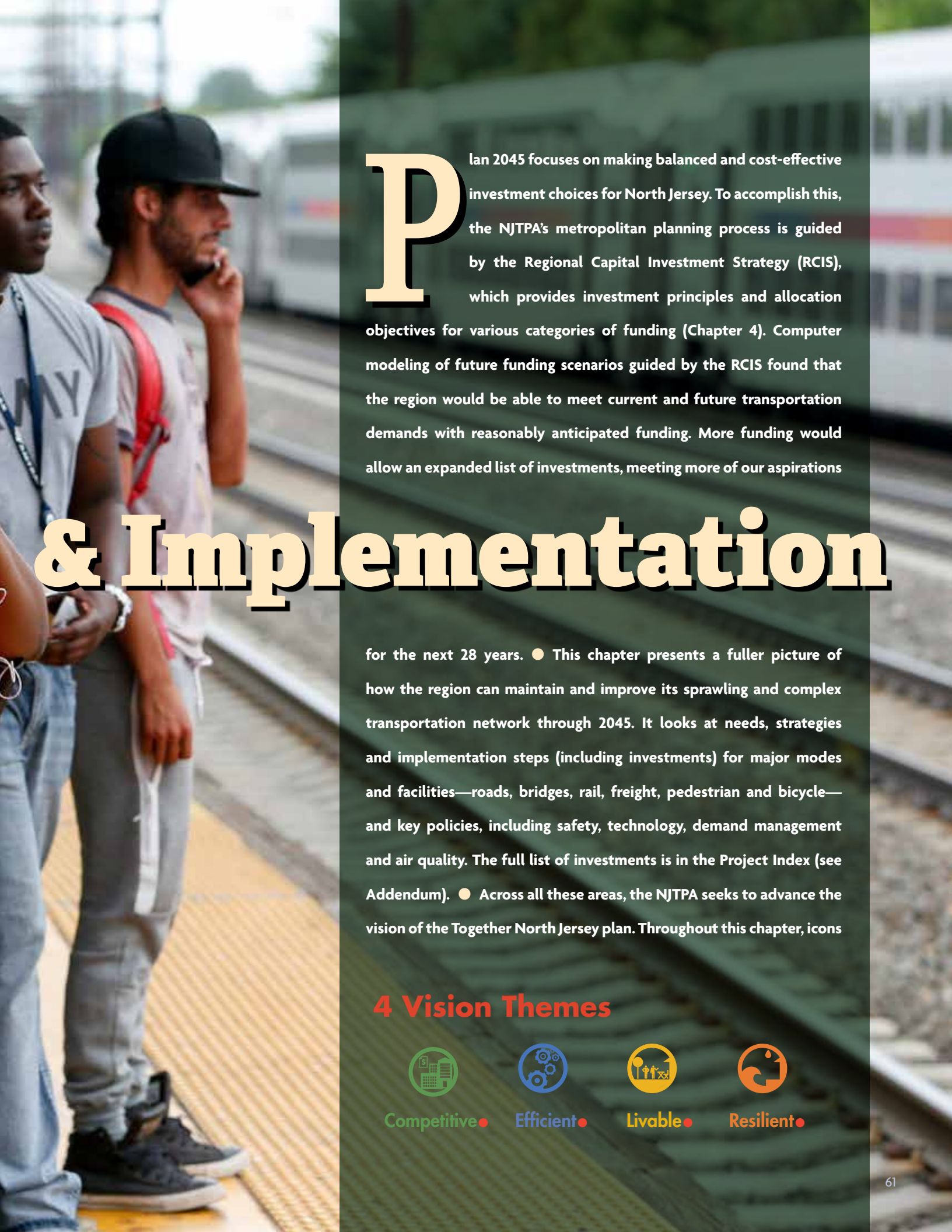
The selected alternative offers a vision for the corridor, which includes increased capacity and service to support the economic vitality of the Northeast, with expanded access to jobs, better connections between urban centers, and a more resilient rail network.

This plan modernizes infrastructure corridor-wide, increasing reliability. It also expands rail capacity with additional infrastructure between Washington, D.C., and New Haven, CT, and between Providence, RI, and Boston, MA, as needed to achieve the plan's service and performance objectives, including investments that increase speeds and eliminate chokepoints.

5

Needs, Strategies

New Brunswick, Middlesex County



& Implementation

Plan 2045 focuses on making balanced and cost-effective investment choices for North Jersey. To accomplish this, the NJTPA's metropolitan planning process is guided by the Regional Capital Investment Strategy (RCIS), which provides investment principles and allocation objectives for various categories of funding (Chapter 4). Computer modeling of future funding scenarios guided by the RCIS found that the region would be able to meet current and future transportation demands with reasonably anticipated funding. More funding would allow an expanded list of investments, meeting more of our aspirations for the next 28 years. ● This chapter presents a fuller picture of how the region can maintain and improve its sprawling and complex transportation network through 2045. It looks at needs, strategies and implementation steps (including investments) for major modes and facilities—roads, bridges, rail, freight, pedestrian and bicycle—and key policies, including safety, technology, demand management and air quality. The full list of investments is in the Project Index (see Addendum). ● Across all these areas, the NJTPA seeks to advance the vision of the Together North Jersey plan. Throughout this chapter, icons

4 Vision Themes

Competitive● Efficient● Livable● Resilient●

Fort Lee, Bergen County

indicate the connections between Plan 2045 and Together North Jersey's four themes and 15 focus areas (see Addendum). The aim is to ensure that transportation supports and is coordinated with broader regional objectives regarding land use, environment, economic development, education and a host of other factors (see Together North Jersey p. 14). In this way, Plan 2045 becomes a guide and resource for all organizations—public and private—working towards regional progress.

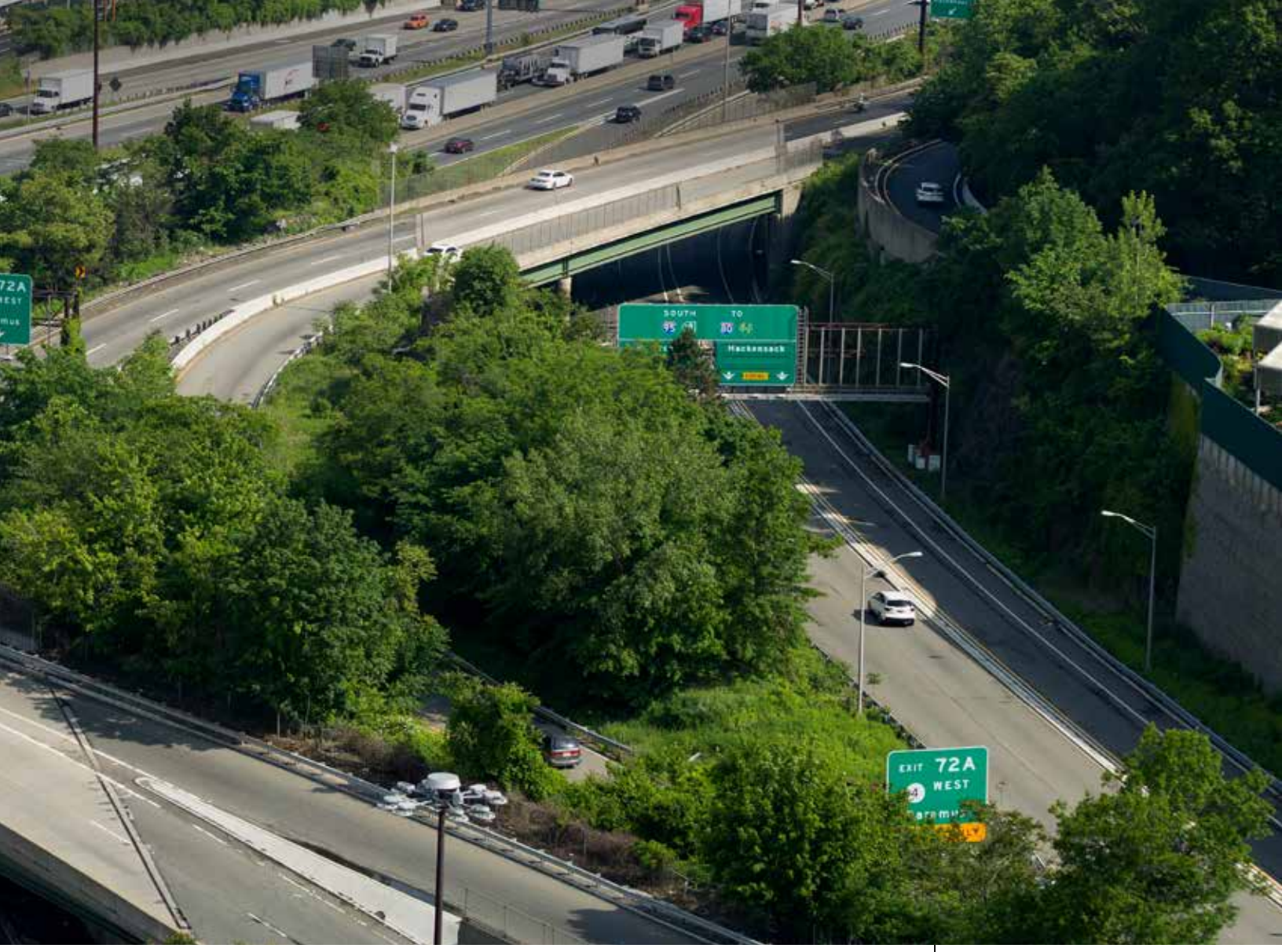
Table 5-1: Change in Pavement Conditions from 2012 to 2015

Pavement Rating	2012	2015
Good	22.3%	25.5%
Fair or Mediocre	27.0%	27.6%
Deficient - Roughness	10.9%	10.2%
Deficient - Distress	25.5%	24.4%
Deficient - Both	14.3%	12.3%
Total	**100.0%**	**100.0%**

Source: NJDOT 2012 and 2015 Pavement Management System

ROADS
Needs & Strategies

New Jersey's economy is highly dependent on the state's extensive road network. Yet heavy daily traffic imposes constant wear on roadways and causes often crippling congestion in some locations, threatening continued growth throughout the region. This can be seen particularly in employment centers such as Newark and Jersey City.



The NJTPA seeks to use investments to improve the speed, reliability and safety of auto and truck trips. At the same time, it encourages road designs that are sensitive to community character and accommodate walking, biking and transit where possible. It is a balanced approach that advances Together North Jersey's livability and economic vitality goals, among others.

For all roadways, regardless of type and function, "Fix It First" remains a guiding investment principle. Many of the key roadways in the region were built decades ago and are due for reconstruction. Others must undergo resurfacing or other maintenance to keep up with heavy wear. Roads that show the most deterioration generally get the highest priority for funding. Where possible, efforts are made to perform cost-effective preventive maintenance to extend the life of a roadway and to limit long-term financial impact.

According to the Pavement Management System, which assesses the condition of roads and offers strategies for maintaining and preserving them, almost half (46.9 percent) of the NJDOT-maintained system is deficient. This represents an **8 percent improvement in pavement conditions** since 2012 (Table 5-1). With VMT projected to increase by 16 percent and freight traffic by more than 40 percent by 2045, the wear and tear on the roadway system add to maintenance

Efficient

◄ Maintain transportation infrastructure in a state of good repair (Strategy 7.1)

Newton, Sussex County

needs; however, the financing of this plan (Chapter 6) allocates sufficient resources to maintain pavement in acceptable condition through 2045.

At the same time, NJTPA funds well-targeted investments to enhance and improve the road network. Expanding or adding new roads is a limited option due to high costs, environmental impacts, and the likelihood that capacity expansion may provide only temporary congestion relief, inducing additional traffic over the long term. After careful study, some expansions may be found justified, particularly, those addressing critical "missing links," such as the completion of access between Interstate 278 and Route 1&9 in eastern Union County.

Another way to improve traffic flow and safety is to address highway and bridge access bottlenecks. The Port Authority is looking to realign and extend the existing George Washington Bridge high-occupancy vehicle (HOV) lane on I-95 by strengthening the shoulder lane to make it usable for this purpose. This improvement would provide an uninterrupted trip for HOVs and buses approaching the bridge from U.S. Route 46. It would also establish direct access for trucks and eliminate the need for trucks to weave through passenger vehicles and an active bus stop in the Borough of Fort Lee.

Efficient

▶ Use technology to improve transportation operations (Strategy 7.7)

The NJTPA seeks many additional improvements to roads and intersections to speed traffic flow and allow them to operate more efficiently. This includes removing bottlenecks, improving traffic signal controls and timing, installing left turn lanes, creating modern roundabouts (see sidebar), controlling road access (such as limiting driveways and curb cuts) and other strategies. In addition, new intelligent technologies, such as **centrally controlled traffic signal** systems that respond to traffic levels and real time information to allow travelers to make informed route or mode decisions, are increasingly important.

In recent years, the NJTPA and its partner agencies have also recognized the need for roads—particularly those serving residential, downtown and commercial

areas—to better accommodate all modes and all users, including walkers and cyclists and the young and old. This inclusive Complete Streets approach has garnered support from a growing number of communities (see sidebar next page).

Among the strategies consistent with Complete Streets are traffic calming measures, such as creating curb extensions at corners and traffic islands for pedestrians, narrowing or converting auto lanes to create bike lanes, and upgrading crosswalks and sidewalks. In downtown areas, these measures, combined with streetscaping, public art, pedestrian malls and other amenities, can create distinctive public spaces conducive to Transit Oriented Development—a particular focus of Together North Jersey grants and pilot projects (see Together North Jersey p. 14).

Road diet, or lane reduction, concepts—and other measures such as adding signalized intersections, creating separate travel lanes for local traffic and buses and improving parallel routes—can also be applied to create **multimodal boulevards** along corridors targeted for residential and retail growth, such as along Route 440 in Jersey City. Also needed are signage upgrades, including **wayfinding related to tourism**—an important economic development strategy—and larger, brighter signage to help older drivers.

However, much of the costs for these and other potential road improvements fall to county and local governments, which face serious budget constraints

Livable

◄ Design places that meet the diverse needs of people in all age groups (Strategy 6.1)

Lincroft, Monmouth County

Roundabouts

Modern roundabouts are one key strategy for making streets safer for all users.

These roundabouts are smaller, safer and more efficient than older traffic circles. They reduce the speed of traffic and the number of potential points of conflict. The Federal Highway Administration says modern roundabouts are one of the most effective proven safety countermeasures.

The New Jersey Department of Transportation and Federal Highway Administration are working together to implement modern roundabouts to reduce severe and fatal crashes. NJDOT offered federal Highway Safety Improvement Program funding for one roundabout project in each county as part of a pilot program. The NJTPA Board approved projects in six subregions in January 2017: Essex, Hunterdon, Monmouth, Morris and Passaic counties and the City of Newark.

These pilot projects, which are slated to be completed within two years, will serve as models for future safety improvements in the region.

Roundabouts reduce the types of crashes where people are seriously hurt or killed by about 80 percent when compared to conventional intersections controlled by stop signs or traffic signals, according to the AASHTO Highway Safety Manual. Roundabouts can address a variety of safety concerns, such as helping to improve flow at a traditional four-way intersection or making it easier to traverse a complex five-point crossing.

Newark, Essex County

Complete Streets

Complete Streets are designed to safely accommodate all roadway users—pedestrians, cyclists and motorists, transit providers and freight movement where needed, including parcel deliveries and truck deliveries to local stores in mixed use locations. They help connect people with the places they want and need to go to, allowing them to access jobs, healthcare, education, affordable healthy food and more. They also can improve health by encouraging walking and cycling.

The NJDOT adopted a Complete Streets policy in 2009, incorporating it into their greenhouse gas reduction plan. As of late 2016, eight NJTPA subregions—Essex, Hudson, Middlesex, Monmouth, Passaic and Somerset counties and the cities of Newark and Jersey City—had adopted their own policies, as well as another 84 municipalities in the region. Statewide, eight counties and 135 municipalities have policies. Some jurisdictions have extensively implemented their policies, improving sidewalk connectivity and street crossings, and striping bike lanes or providing other bicycle accommodation. The NJTPA encourages all counties and municipalities to consider adoption and implementation of Complete Streets policies, including appropriate accommodation for freight movement.

Communities can implement Complete Streets in a variety of ways. Examples include installing wider sidewalks, narrowing traffic lanes to slow vehicles, adding bicycle lanes, adding dedicated bus lanes and constructing median islands and additional crosswalks. Technical resources such as the 2017 State of New Jersey Complete Streets Design Guide are available to inform communities on design standards and best practices.

Research shows that investments in active transportation infrastructure, like bicycle lanes and sidewalks, can bolster local economies. When people feel safe walking a street, they are more likely to patronize local businesses. This makes walkable and bikeable downtowns more attractive to potential residents.

Together North Jersey supports Complete Streets policies and implementation because they make transportation more safe, convenient and reliable. Implementing Complete Streets policies requires public education and active consideration of changes to road design.

maintaining existing road networks. While federal funding is available for some improvements, and NJTPA has a number of programs available to assist counties with the improvements, obtaining the funding involves following a complicated and lengthy process to meet federal requirements.

In the NJTPA region, counties own more than 3,700 centerline miles (56 percent of all county roads in the state). This represents 14.5 percent of all roadway miles in the NJTPA region. Municipal roads constitute the largest share of the roadway miles, at almost 20,000 miles or 76 percent of roads in the region. Beginning in FY 2018, Local Aid to counties increased to $400 million per year (up from $190 million each year). However, counties and municipalities will continue to confront a growing backlog of road projects. This plan supports expanded state funding for county and local road and bridge needs.

The NJTPA also seeks to prepare roads for new vehicle technologies. In particular, support for electric vehicle charging stations will encourage greater use of these vehicles, which reduces air pollution and greenhouse gases, a goal of resiliency strategies. In the long term, hydrogen fueling infrastructure may be needed. The NJTPA will continue to work with communities and organizations to encourage use of alternate fuel vehicles. At the same time, roads must be adapted to provide the communications infrastructure needed for connected and autonomous vehicles, as discussed in this chapter's technology section. These efforts will involve close coordination with companies that are leading the development of new vehicle technologies.

This plan also seeks to support the road network's vital role in accommodating many thousands of bus trips each day through a variety of improvements akin to those used for Bus Rapid Transit (BRT). To facilitate bus travel, project designs can incorporate bus pull-outs, park-and-ride access and other features. In addition, bus travel can be enhanced by "bus on shoulder" operations as seen in Middlesex County along Route 9 and under study on Route 1. Bus signal priority makes for faster bus trips that are more competitive with auto travel.

The road system also accommodates heavy truck volume. As discussed in the freight section, improvement strategies can include partnerships with the private sector to shift truck deliveries to off-peak hours, helping lessen congestion and reduce business costs. Plan 2045 supports these and other approaches to more efficient use of roads by all modes and users.

Implementation

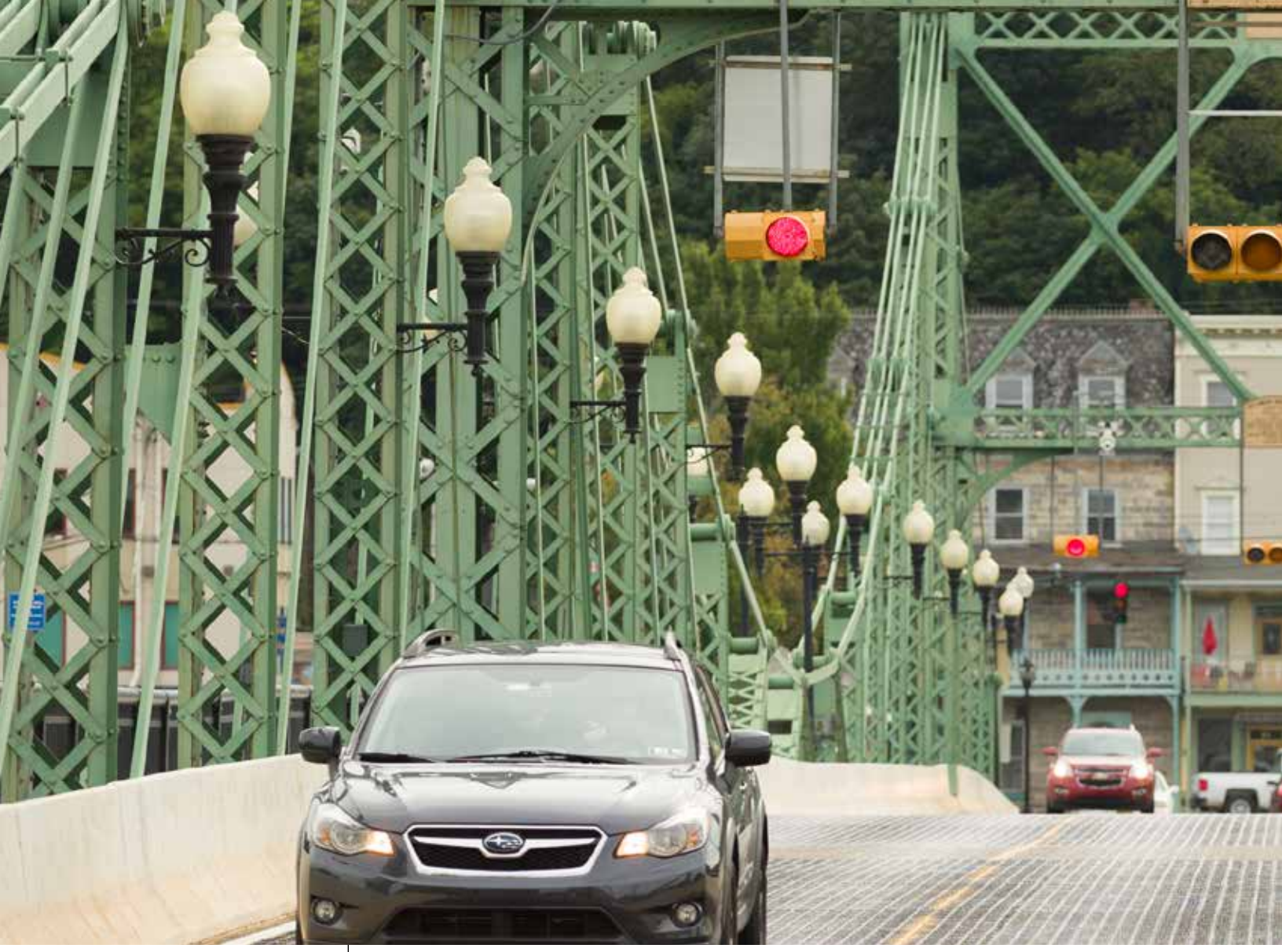
In the near- to mid-term, the region can expect to see significant progress in addressing its maintenance needs and reducing road project backlogs. Through 2045, it is anticipated that **approximately $22 billion will be invested** in preserving, repairing and reconstructing the road network. This represents approximately 17 percent of all investment, in accordance with the RCIS, discussed in more detail in Chapter 4.

There are several larger roadway improvement projects included in Plan 2045 in the near to mid-term, as follows:

- Route 3, Route 46, Valley Road and Notch/Rifle Camp Road Interchange, Contract B, Passaic County, $136 million. Construction in 2019
- Route 80, WB Rockfall Mitigation, Warren County, $59 million. Construction in 2020

Efficient

◄ Maintain transportation infrastructure in a state of good repair (Strategy 7.1)



Phillipsburg, Warren County

- Route 34, CR 537 to Washington Avenue Pavement, Monmouth County, $90 million. Construction in 2025
- Route 9, Indian Head Road to Central Avenue/Hurley Avenue Pavement, Ocean County, $53 million. Construction in 2019
- Route 3 and Route 495 Interchange, Hudson County, $53 million. Construction in 2026
- Route 80, Route 15 Interchange, Morris County, $64 million. Construction in 2022
- Route 7, Kearny, Drainage Improvements, Hudson County, $81 million. Construction in 2020
- Route 1&9 Interchange at Route I-278, Union County, $65 million. Construction in 2019
- Route 206 Projects, Somerset County, $438 million. Construction in 2018

NJDOT management systems, which help guide road and bridge maintenance, and the use of performance measures discussed in Chapter 4, will help identify cost-effective projects to enhance or expand roads and other infrastructure. These projects will implement the numerous strategies identified above—intersection upgrades, improved access management, centralized traffic signals, connected vehicle technologies and more.

The projects will be developed, evaluated and funded through the NJTPA planning and capital programming process, which will include continued cooperation between the NJTPA and its partner agencies to streamline project delivery and make more cost-effective use of available funding.

Project development will be guided by the principles in the RCIS, including advancing Complete Streets, supporting resiliency to potential natural and man-made disasters, facilitating freight movement, supporting regional transit and making travel safer for all users, **including bicyclists and pedestrians** (see Chapter 4).

Livable●

◄ **Design places that meet the diverse needs of people in all age groups (Strategy 6.1)**

BRIDGES

Needs & Strategies

Repair and replacement of bridges still requires a large share of available funding, ranging from 20 to 30 percent per year. The RCIS goal is for a 20 percent allocation over the life of the plan, with the amount falling as the most critical needs are addressed. This funding is used to maintain the region's nearly 4,800 bridges, large and small. Many bridges were built decades ago. Each year, many come due for

Pulsaki Skyway between Jersey City, Hudson County and Newark, Essex County

repair, improvement or replacement, and others must be continually maintained. Responsibility for this work falls mostly to the State or county governments, which have jurisdiction over most bridges (Table 5-2). The Bridge Management System, administered by NJDOT in coordination with the NJTPA, helps prioritize these projects by systematically assessing bridge conditions, life cycle costs and other factors.

About 26.2 percent of the region's bridges under the jurisdiction of NJDOT (Table 5-3) are functionally obsolete, which means they do not meet current design standards for clearance, lane and shoulder width, and/or road geometry. Another 8.6 percent are structurally deficient, meaning their deck or bridge structure is deteriorated (though such bridges may remain safe to use for many years). Investments made since 2012 have maintained and slightly improved the overall condition of the region's state-owned bridges, despite the yearly accrual of new repair and replacement needs.

In addition, NJ TRANSIT owns 525 rail bridges in the NJTPA region and 575 across all of New Jersey.

Efficient

▶ Maintain transportation infrastructure in a state of good repair (Strategy 7.1)

Investments in recent years have included work on several major NJDOT bridges, totaling over $3 billion including the following, which are complete or nearing completion:

- Route 1 & 9, Pulaski Skyway, Essex / Hudson Counties, $1.5 billion
- Route 7, Wittpenn Bridge, Hudson County, $700 million
- Route 72, Manahawkin Bay Bridges, Ocean County, $331 million
- Route 280/Route 21 Interchange Improvements, City of Newark, $137 million
- Route 37, Mathis Bridge EB over Barnegat Bay, Ocean County, $79 million
- Route 495, Route 1 & 9/Paterson Plank Road Bridge, Hudson County, $68 million

Other major NJDOT bridges are slated for future repair or replacement, as noted in the Implementation section below.

The region's counties face growing costs for the more than 2,100 major bridges and 4,100 county-owned minor bridges under their jurisdiction. Almost 200 major bridges are structurally deficient and 450 are functionally obsolete. Approximately 600 minor bridges are also in need of repair or replacement. Meeting the region's existing county bridge basic repair needs is estimated to cost almost $650 million. This does not include resources needed for bridge replacement or associated approaches, and may be vastly under-estimated. The renewal of the State's Transportation Trust Fund in 2016 provided some help in meeting these needs. It increased the statewide County Aid program to $400 million annually, more than doubling the previous level of $190 million per year. Nevertheless, funding will need to increase over the long term to meet growing needs.

For bigger, more expensive county bridge projects (and selected road projects), the NJTPA's Local Capital Delivery Program offers a means to access federal funding for repair or replacement. Balanced with safety, multimodal, community and other needs, maintaining the historic character of local bridges is a strong consideration of this program. Initial competitive grants support concept development studies in which counties and cities investigate all aspects of a potential project, including environmental, right of way, access, design, and feasibility issues. During Fiscal Year 2017, nearly $3 million in funding was awarded for five such studies to investigate options for replacing or rehabilitating aging bridges and a sixth to explore reconfiguring a busy corridor.

The next phase is typically the Preliminary Engineering phase, in which projects are further developed and refined to a level of detail necessary to receive federal environmental approval under the National Environmental Policy Act (NEPA). This work enables a project to be considered for inclusion in the NJTPA's annual Transportation Improvement Program (TIP).

Implementation

Maintaining and improving bridges is critical to strengthening the region's economy and providing safe and convenient travel for people and goods.

In the near- to mid-term, this plan calls for continued efforts to reduce the backlog of needed bridge investments and improve preventative maintenance. These will help moderate future investment needs. Additional costs savings may be realized through continued exploration of new materials, engineering techniques and project streamlining. These savings could allow for additional funding for municipal and county aid, expansion of the Local Capital Project Delivery Program or similar programs.

Major bridges slated to be addressed over the next several years include:

Table 5-2:
Bridges in NJTPA Region by Ownership

Bridge Owner	Quantity
Major County Bridges	1960
NJDOT	1720
NJ TRANSIT	153
City / Town	9
Turnpike	855
All Other	96
Total for NJTPA Region	**4793**

Source: NJDOT 2012 Bridge Management System

Table 5-3:
NJDOT-owned Bridges in the NJTPA Region

NJDOT Bridge Conditions	2012	2015
Not Deficient or Obsolete	64.8%	65.2%
Structurally Deficient	9.2%	8.6%
Functionally Obsolete	26.0%	26.2%

Source: NJDOT 2012 and 2015 Pavement Management System

- Route 80 WB, 8-mile corridor with multiple bridges between McBride Avenue (CR 639) and Polify Road (CR 55), Bergen / Passaic Counties, $340 million. Construction in 2022
- Route 3, EB, Bridge over Hackensack River and Meadowlands Parkway, Bergen / Hudson Counties, $90 million. Construction in 2023
- Route 4, Hackensack River Bridge, Bergen County, $84 million. Construction in 2025
- Route 80, Bridge over Passaic River, River View Drive, and McBride Avenue, Passaic County, $61 million. Construction in 2022
- Rumson Road over the Shrewsbury River, CR 520, Monmouth County, $66 million. Construction in 2020

Resilient●

▶ Adapt infrastructure to be resilient to extreme weather events and to the impacts of climate change (Strategy 10.2)

In the long term, new funding will be needed to meet the demands of an ever-growing population and economy and the wear from increased travel and goods movement. The impacts of climate change are a critical concern as bridges are particularly vulnerable to storms and flooding even as they are needed for evacuation and movement of critical supplies in an emergency. Funding should be prioritized to improve resiliency of the region's bridges. Bridge repair or replacement projects must **address resiliency concerns in design and engineering**.

Newark, Essex County

TRANSIT
Needs & Strategies

Every weekday, travelers make more than 928,000 trips on the region's extensive public transportation system. Transit contributes greatly to the region's quality of life and provides essential travel options, particularly for the disabled and those without cars. Transit usage diverts thousands of trips from roads, helping reduce congestion, safeguard air quality and cut greenhouse gas emissions.

The NJTPA seeks to support the RCIS Principle to "Expand Public Transit" by supporting investment to improve the transit network and expand services to new markets while ensuring that transit service continues to be provided at robust levels to existing markets, as demand warrants. Plan 2045 calls for continuing strategic investment to make transit a viable alternative for an increasing share of residents.

The current funding priorities are maintaining the system in a state of good repair and operating it in a safe and secure manner. This includes **replacing buses, railcars and locomotives** as they age, as well as attending to more than 600 rail bridges, 500-plus miles of track, signal systems, stations, and other infrastructure. The Transit Needs Appendix provides details of the region's long-term transit investment priorities. Among the key needs and strategies are the following:

Efficient

◄ Enhance and improve existing public and private transit services (Strategy 7.4)

Efficient

▶ **Maintain transportation infrastructure in a state of good repair (Strategy 7.1)**

▶ **Increase transit system capacity at strategic locations (Strategy 7.5)**

The Hudson Tunnel Project/Gateway Program The highest priority transit rail project is **constructing a new trans-Hudson tunnel** to maintain the current level of service while repairs are made to the existing century-old tunnel. There are also plans to **replace the Portal North Bridge** over the Hackensack River, which carries about 450 trains a day from Newark to New York Penn Station. In addition, the Hudson Yards Right-of-Way Preservation Project/Concrete Casing Section No. 3 would complete protective ROW construction beneath ongoing West Midtown development.

Amtrak's larger Gateway Program, which will provide additional capacity, reliability and resiliency improvements, as well as expansion of New York Penn Station, is a longer-term priority. It will be needed to meet the expected 31 percent increase in rail ridership by 2045 (see Trans-Hudson Travel p. 58). Additional capacity gained through the Gateway program is necessary for trans-Hudson services increases, such as institution of the one seat ride to New York City on the Raritan Valley line, which would also likely require additional investments in New Jersey.

Efficient

▶ **Use technology to improve transportation operations (Strategy 7.7)**

Other Commuter Rail Needs—The region also needs to invest in technology to improve safety and efficiency, such as **Positive Train Control (PTC)** and bus signal priority, as well as improvements to the rail system, including the Midline Loop near the Jersey Avenue station on the Northeast Corridor, track improvements along the Northeast Corridor, adding tracks to other heavily used lines, upgrading signals and upgrading stations to ADA standards.

Future forecasts anticipate continued growth in demand, and indicate that existing train volumes will need to be supplemented through the selective (re)introduction of capacity in the core rail system to enable increased levels of rail service. Investments now being made in projects such as County Yard on the Northeast Corridor or the pocket track in Summit on the Morris & Essex Line are examples of what will be needed as rail service is increased.

The Hunter Flyover is among the new connections needed. It would enable eastbound Raritan Valley trains to travel from the Lehigh Line to the Northeast Corridor eastbound tracks without crossing at-grade in front of other westbound trains. The current eastbound train movement at-grade slows train services and reduces the Northeast Corridor's capacity south of Newark Penn Station. Amtrak's plans for more intercity and faster train services require the elimination of this at-grade crossing. NJ TRANSIT also needs to add trains on the Northeast Corridor to accommodate the projected growth in ridership on that line.

Jersey City, Hudson County

Light Rail—The region has two light rail systems: the Hudson Bergen Light Rail (HBLR) and the Newark Light Rail. Each system requires ongoing maintenance, and two proposed extensions to the HBLR line will require a major capital investment. The first is a .7-mile elevated extension across Route 440 in Jersey City to connect to a large mixed-use brownfield redevelopment project underway along the Hackensack River waterfront. The other project is the Northern Branch, which would extend the line from its terminus in North Bergen,

Hoboken, Hudson County

Hudson County, through four communities into Englewood in Bergen County. NJ TRANSIT has taken steps to increase capacity on the existing lines, by purchasing larger vehicles. However, as the system grows and capacity is added, maintenance and train storage facilities may need to be expanded.

PATH—The PATH system, operated by the Port Authority of NY & NJ, has seen more riders in recent years. This growing ridership is expected to continue in coming decades. In response, the Port Authority is replacing the PATH signal system, allowing trains to safely run closer together, improving stations, upgrading power substations and considering a possible extension to Newark Liberty International Airport. New development in the Journal Square and Grove Street station areas in Jersey City is pointing to the need to expand PATH station and fleet capacity to meet new demand.

Resiliency—Both NJ TRANSIT and the Port Authority have committed to improving the resiliency of their systems to prevent future damage and to prepare for possible future extreme weather events and security threats. This includes significant new investments in a series of hardening projects such as new rail vehicle storage, upgraded power systems, maintenance facilities, emergency control centers, security improvements and signal and communications systems resilience upgrades.

Bus Upgrades—About two-thirds of transit trips are made on buses. NJ TRANSIT and private companies provide intra-state and interstate services. There will be an ongoing need for additional bus garages and layover locations to meet projected future transit demand. **The Port Authority Bus Terminal** in midtown Manhattan is the largest in the nation—and busiest in the world. It served more than 66 million passenger trips in 2014. The Port Authority recognizes that

Efficient

◄ Increase transit system capacity at strategic locations (Strategy 7.5)

the terminal has become functionally obsolete and needs to be replaced to accommodate growing demand. The agency included $3.5 billion in funding in its 2017-2027 Capital Plan to begin the process of designing and ultimately constructing a replacement facility. The Port Authority recently completed extensive renovations of its George Washington Bridge Bus Station.

Also important is investment in bus terminals and facilities in New Jersey. NJ TRANSIT is partnering with the City of Passaic and Passaic County to implement a new bus terminal in downtown Passaic. NJ TRANSIT, Passaic County and the City of Passaic successfully partnered to win a competitive Federal Transit Administration (FTA) grant to relocate and improve the existing bus facility. Other terminals, such as the Journal Square Transportation Center, one of the busiest bus terminals in the country, provide critical local and regional service (through transfer to the PATH system).

Other Bus Investments—NJ TRANSIT continues to explore BRT services, which offer speed and efficiency similar to light rail but at lower costs. Bus system improvements include implementing bus signal priority, allowing buses to use shoulder lanes, and other efficiencies. The NJTPA has worked closely with NJ TRANSIT to examine potential BRT applications and other bus enhancement. Investments in alternative fuel vehicles, "smart bus" technologies and improved traveler information (on both bus and rail systems) are also needed.

Operating Funding—Although transit ridership is expected to continue growing, capital funding for expanding the bus and rail system is very limited in both the short and long term. NJ TRANSIT also faces constraints on its operating budget. There is a critical need for stable operating resources to supplement fare box collections and existing operating subsidies, as discussed in Chapter 6.

Efficient

▶ Enhance and improve existing public and private transit services (Strategy 7.4)

Private bus carriers—Several carriers such as Academy, Lakeland, TransBridge, DeCamp and Coach USA provide critical long-haul transit service from Monmouth, Somerset, Morris, Bergen Sussex, Hunterdon and Ocean counties to Newark, Jersey City and New York City. There is continued need to **identify park and ride opportunities** for their passengers, as well as bus storage facilities close to the urban core. Other private operators use smaller bus vehicles commonly known as jitneys that supplement NJ TRANSIT service primarily in Bergen, Hudson and Passaic counties, mainly providing service to New York City. Local and state government must continue efforts to insure safe and responsible jitney operations that supplement but do not compete with NJ TRANSIT.

Livable

▶ Locate development in areas that are walkable, bikeable, and accessible by public transit (Strategy 6.4)

Ferries—Private ferries operated by NY Waterway, Seastreak and Liberty Landing Ferry link Bergen, Hudson and Monmouth counties with New York City. Ferries have proven to be critical linkages during disruptions to the transit and road networks—seen most dramatically in the days after September 11, 2001. Some ferry services include convenient shuttle bus connections on both sides of the river. There is a continued need for support for ferry terminals and landside access. The NJTPA supports efforts to **facilitate multi-modal access to bus stops and ferry terminals** through improved access for pedestrians and bicyclists, as well

as through **transit-supportive land use near ferry terminals**. The NJTPA completed an Inventory and Assessment of Waterborne Transportation Resources in December 2016, which identified several opportunity sites for future passenger and freight waterborne transportation across the region.

Transit Access—The NJTPA encourages and supports measures that make it easier for travelers to access transit to connect **to a wide range of destinations** in the region and beyond. Such an intermodal system encourages people to use transit for a part or all of their trips. Methods for accomplishing this that must be explored include: expanding park-and-rides and developing new transit hubs; supporting local shuttles and last-mile connection services; encouraging expansion of bicycle and pedestrian access to transit, and accommodations at stations; implementing seamless and user-friendly fare integration across modes, systems and carriers; facilitating automated and off-board fare collection and expanding real-time transit information for riders; and supporting Transportation Management Associations, which provide a host of transit access programs and services (see Transportation Demand Management section). Some Transportation Management Associations are exploring partnerships with ride-hailing services such as Uber or Lyft as flexible last mile connections.

Livable●

◄ **Locate development in areas that are walkable, bikeable, and accessible by public transit (Strategy 6.4)**

Implementation

North Jersey's transit system faces the difficult challenge of maintaining a state of good repair on its extensive, heavily used existing infrastructure while also expanding capacity to prepare for anticipated growing ridership. To do so, the NJTPA and its partners over the long term must address the need for sufficient funding to support expanded capital investments and operations. Notably this includes the need for additional trans-Hudson rail capacity, which must be addressed cooperatively by New York, New Jersey, Amtrak and federal partners.

There are numerous proposals to expand rail capacity, but funding has not been fully identified. While some studies have been completed, some of these projects need further assessment before moving forward to determine their feasibility and potential for attracting the ridership needed to sustain operations. The project index at the back of this plan includes several rail expansions, such as the previously mentioned extensions of the Hudson Bergen Light Rail, which are recommended for implementation as funding becomes available.

Expansion of the rail system must be accompanied by **transit-supportive land use measures**. This includes creating walkable neighborhoods that can support development near train stations and bus hubs. Together North Jersey promotes transit-oriented development and transit-supportive development and encourages local officials, planning boards and developers to support mixed-use developments around rail and bus transit. Such developments can foster job growth, bolster the local economy and support public transit by providing enough riders to fiscally sustain services The NJTPA's Planning for Emerging Centers program offers

Livable●

◄ **Locate development in areas that are walkable, bikeable, and accessible by public transit (Strategy 6.4)**

Hoboken, Hudson County

competitive grants for technical assistance to support municipalities in creating more sustainable, transit-supportive and walkable communities.

The NJTPA is also committed to investing capital and planning funds that support improved access to and sustainable land use development around PATH, ferry and private bus carrier facilities. Public sector capital investments in ferry terminals, vessels and supporting facilities should be considered over the long term to ensure their viability to meet daily travel needs, as well as the need for redundant services when other trans-Hudson transportation service is disrupted.

While the advent of automated vehicles over the next decade is expected to provide new options for personal (non-transit) travel, it may also offer opportunities for new feeder systems for transit in low density areas—possibly even through automated, on-demand bus circulation systems. The NJTPA, working with NJ TRANSIT and other partners, must assess the development and potential of future vehicle technologies to ensure wide public benefits.

Union County

TRANSPORTATION TECHNOLOGY

Needs and Strategies

Transportation technology is poised to dramatically alter transportation in the region. Self-driving and connected vehicles, new freight systems built around 3-D printing, changes in how people work and much more (see chapter 2) will affect the future of travel. There is great uncertainty about just when and how potentially transformative technologies will arise.

Yet many recent technology advances are already offering great benefit to the region. In particular, technologies collectively known as Intelligent Transportation Systems (ITS) are making the existing transportation system more efficient. These include centralized traffic signal systems that adapt to traffic flows; variable message signs to direct travelers; systems to coordinate incident management to clear crashes and incidents more quickly; integration of transit fares through smart cards; and the use of real-time data to inform travelers, manage road and transit systems and assess facility operational needs.

The NJTPA and its partner agencies are actively coordinating the adoption and application of these and other ITS systems as a means to make more efficient use of existing capacity and improve safety. One key initiative

Efficient

◀ Use technology to improve transportation operations (Strategy 7.7)

Livable

▶ Use public investment programs to create, connect and strengthen access to opportunity (Strategy 8AB.3)

is the joint development and updating of an ITS guidance document called **The Connected Corridor**. It includes technology standards and protocols—called the state ITS architecture—and addresses strategies for improved management of transportation systems and their operation. The Connected Corridor and other efforts to advance ITS must continue and broaden in coming years to keep pace with the expected acceleration in technology development.

The application of ITS must also be coordinated and integrated with wider technology systems. A growing number of cities, including Newark and Paterson, are beginning to **implement "Smart City" programs** that use technology to better manage and operate key civic functions including public safety, health care, public services, water, sewer systems and more. Transportation is integral to connecting all elements of Smart Cities, becoming part of the so-called "internet of things," in which people increasingly interact with connected machines on a daily basis. If managed effectively, this will open many new opportunities for realize the livability, accessibility and other goals embodied in the Together North Jersey plan.

However, achieving effective use of technology will not solely be a responsibility of public agencies. Many ITS and Smart City technology systems are under development by private companies and are being looked to as the foundation for profitable new industries. Public-private partnerships will play an important role in ensuring investments are coordinated and equitably serve all segments of the population. Ultimately, new legal and policy frameworks must be put in place to ensure that the deployment of the most advanced technologies—including autonomous vehicles—serves the public interest. Of concern is not only investments in infrastructure and physical systems but the management, ownership and use of vast amounts of data generated by and required for the operation of many technologies. The NJTPA and MPOs around the country will play an important role serving as data repositories, assessing technology advances, and coordinating public and private interests in addressing emerging issues.

Implementation

The region invests capital funds through the TIP each year in ITS-related projects and programs in keeping with the 4 percent investment target in the RCIS (see chapter 4). The region must be prepared to increase these investments as technologies advance. This includes upgrading infrastructure to accommodate autonomous or connected vehicles (which, among other features, depend on data from beacons and other wired roadway elements). Transit vehicles and operations must also be upgraded for new systems.

JEFF SWENSEN / GETTY IMAGES

As noted, public-private partnership must be pursued where feasible to share costs and speed implementation of needed investments. In all ITS deployments, designers and operators must take measures to ensure cyber security and resilience to weather and unforeseen emergencies.

In addition to capital investments, among the key measures the NJTPA will pursue over the life of this plan for effectively implementing ITS are the following:

Secaucus, Hudson County

Updating ITS architecture As noted, the Connected Corridor will be an ongoing effort to ensure all public agencies in the state coordinate technology standards and deployment.

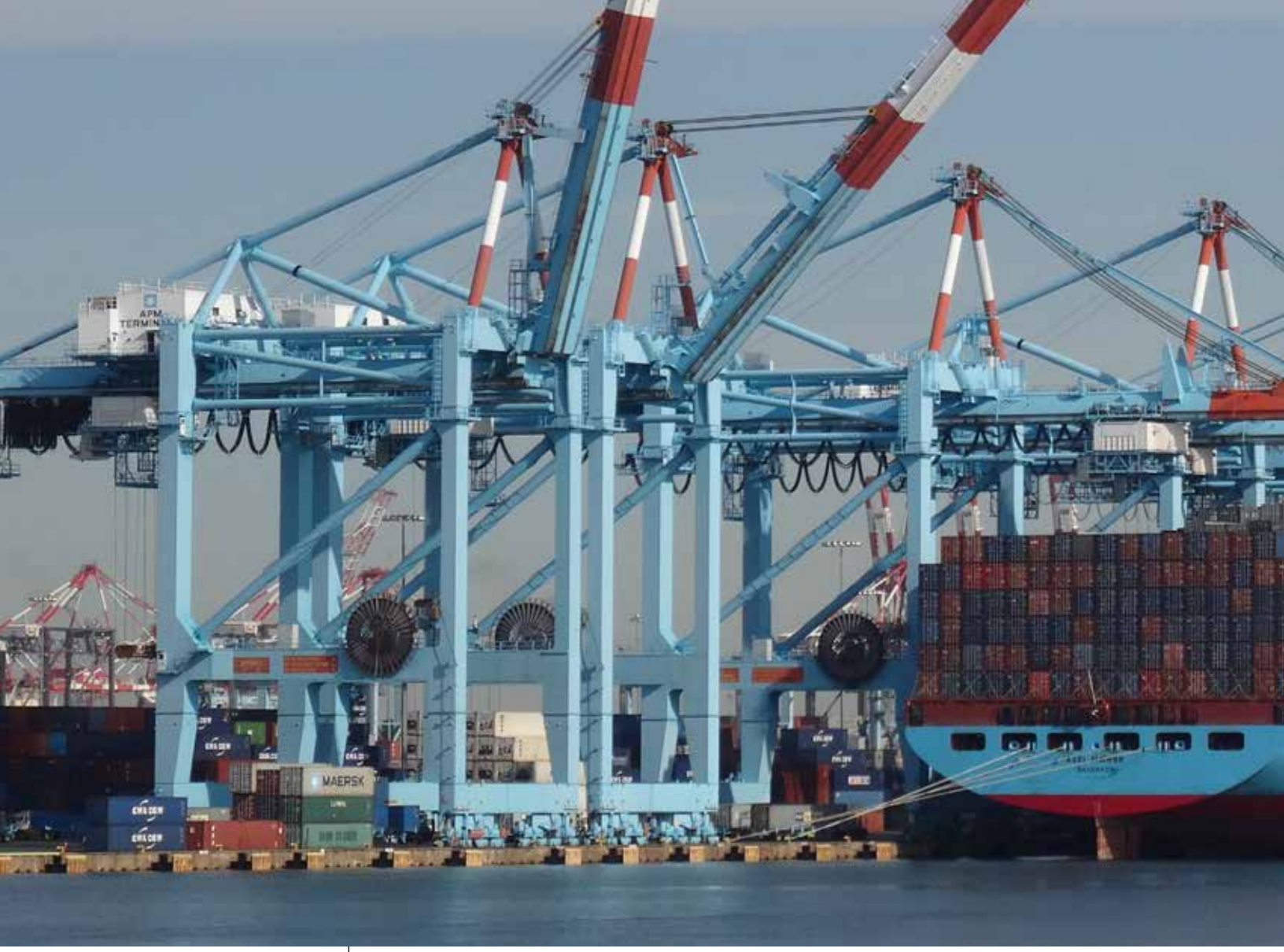
Planning tools and data The NJTPA will work with its subregions, partner agencies, the private sector and other MPOs and organizations nationally to make effective use of the large volume of real-time data being generated about transportation system conditions and operations. Tools using the data will assist in **providing traveler information**, measuring system performance, planning investments and other applications.

Corridor Management NJTPA will cooperate with subregions and partner agencies in assessing needs along major corridors and applying technologies to aid operations. Integrated Corridor Management projects, some in cooperation with New York transportation agencies, will be supported.

Incident management NJTPA will continue to work with other agencies, principally TRANSCOM, a coalition of the 16 major traffic, transit and public safety agencies in the New York/New Jersey/Connecticut region, to improve the region's ability to detect, respond to, and clear traffic incidents to improve traffic flow and highway safety.

Efficient

◄ Expand the use of innovative planning tools that promote smart development (Strategy 5.4)



Competitive●

▶ Leverage the region's role as a major freight distribution hub (Strategy 3.2)

FREIGHT
Needs & Strategies

The region's good movement system is an integrated multimodal network of roads, freight rail lines and terminals, port facilities, air cargo facilities, and warehouses/distribution centers. The region's role as a freight hub for the northeastern United States is a key advantage in retaining and attracting businesses, and in **supporting the region's overall economy**.

But leveraging this key competitive asset, as called for in the Together North Jersey plan, requires addressing a host of freight infrastructure needs and issues. In particular, the region must make investments in and optimize the operations of the following modes and facilities:

Truck movements Both long distance and local truck trips are particularly important as nearly all freight moves via truck for at least part of its journey. Five of the six major truck corridors in the state are located in North Jersey—the New Jersey Turnpike, I-78, I-80, I-287 and NJ 17. With overall freight volumes in the region expected to grow by 40 percent through 2045, the busiest roads will see even higher truck volumes. Pavement and bridges along key trucking routes must be maintained

Port Newark, Essex County

to meet these demands and to ensure safe, efficient truck travel. In addition, highway improvements must be supported that could improve truck flow, such as separating trucks from general purpose lanes where applicable. Over the next decade, autonomous trucks and platooning technology will require careful planning and oversight.

Local roads are also vital. They are often the only available connections between freight facilities and major highways. To enhance access to all port and airport facilities, improvements on these local connector roads are needed. These include turning lanes, increased bridge clearance, upgraded pavement, improved signal timing, improved and enhanced rail access, and upgraded intermodal transfer facilities.

For example, the Port Authority's proposed Port Street and Corbin Street Improvement Project could significantly improve the only northern access points in the regional roadway system connecting to the Port Newark/Elizabeth Marine Terminal, the largest container-handling complex in the bi-state harbor. It could improve traffic safety and travel time and reduce congestion and terminal-related intermodal truck queuing. The project also would incorporate ITS technology to reduce congestion and improve the safety of the port's roads.

Engelwood, Bergen County

Efficient

▶ **Adopt and implement "Complete Street" policies (Strategy 7.2)**

Competitive

▶ **Leverage the region's role as a major freight distribution hub (Strategy 3.2)**

Efficient

▶ **Prioritize brownfields for redevelopment (Strategy 5.3)**

Working to **ensure that local roads accommodate appropriate locally focused freight needs in a way that is safe for all users**—particularly in residential neighborhoods—is a priority of the NJTPA and vital for the continued economic growth of the region. Where possible, freight facilities (and ancillary users of heavy freight such as industry and warehousing) should be located proximate to major roadways and designated truck routes.

Another important need is for additional secure parking facilities for truck drivers—primarily to accommodate overnight parking to meet federal driver rest requirements. Without adequate parking, trucks park on highway shoulders creating a serious safety hazard.

The Port District This district encompasses publicly owned Port Authority facilities as well as privately owned marine terminals. The completion of the project to **increase clearance under the Bayonne Bridge**, together with cooperation between the public sector and private freight companies to improve on-dock rail yards, express rail, chassis handing and other operations, will ensure the port's long-term viability. This includes providing and maintaining adequate channel depth and landside road and rail infrastructure to support larger ships that are passing through the expanded Panama Canal and are capable of carrying nearly three times the amount of cargo as older vessels. Over the long term, the region will need expanded port capacity and waterside sites to handle the projected increase in freight and port activity. Expanded capacity should also include short-sea shipping lines, which have the potential to remove trucks from regional roads.

Warehouse and distribution center Development of these facilities has intensified throughout the region, including construction in existing clusters and in-fill locations in more urbanized areas. Brownfield redevelopment

presents a great opportunity to **locate distribution centers closer to the region's core** thereby minimizing the miles traveled by trucks. Additionally, with vacancy rates at all-time lows and lease rates increasing, redeveloping brownfield sites may be an economically viable way to meet the need for more distribution facilities. In addition, improved truck traffic management, off-peak delivery and truck parking must be explored to accommodate these changing patterns. Communities throughout the region must advance best practices in truck management, support needed truck parking and find balanced approaches to accommodate off-peak delivery as part of complete streets programs as deliveries and warehouses increasingly become 24/7 activities.

Freight rail The freight rail system faces capacity constraints and issues related to legacy infrastructure. Capacity constraints include the shared passenger/freight service segment of the Lehigh Line and North-South rail connectivity. Legacy infrastructure physical constraints are most evident in the movement of freight rail industry national standard rail cars with Plate "F" dimensions (17 feet high and 10.5 feet wide) and loaded car weights of up to 286,000 pounds. As discussed in the implementation section, the NJTPA is supporting efforts to address these operational and physical constraints.

Air Cargo Newark Liberty International Airport (EWR) is the region's air cargo hub. It hosts significant Federal Express and UPS facilities. There are many needs associated with moving freight to and from EWR, including improved access to air cargo facilities, improved connections between the air terminal and offsite warehouse and distribution centers and improved signage for freight-related access and facilities.

Building on these and other existing freight assets is essential to support and strengthen the region's economy. Changes in the nature of freight commerce stemming from technology and growth of e-commerce represent major challenges and uncertainties for the future. Technologies that will greatly impact freight systems include **truck platooning, autonomous vehicles, 3-D-printing** and more (see Chapter 3). As with other aspects of the regional transportation network, resiliency must continue to be addressed in all freight investment. The NJTPA and its partner agencies must work closely with the private sector to accommodate the changes and safeguard the region's freight assets.

Efficient●

◄ Use technology to improve transportation operations (Strategy 7.7)

Bayonne, Hudson County

Implementation

The NJTPA's efforts to address freight needs and implement the strategies discussed above are overseen by the NJTPA Freight Initiatives Committee (FIC), composed of local elected officials and agency representatives from the NJTPA Board. The committee's bimonthly meetings serve as a forum for discussion of regional freight issues.

Important guidance for the FIC and NJTPA's ongoing freight planning is provided by the New Jersey Statewide Freight Plan, a federally required document, developed by a

Competitive●

▶ Connect regional priorities/strategies. (Strategy 3.4)

Efficient●

▶ Use technology to improve transportation operations (Strategy 7.7)

wide range of partner agencies in the state, with input from the private sector and other interests. It was finalized in fall 2017 and addresses the full range of freight issues facing the state and region.

The NJTPA continues to expand its freight planning efforts. This includes supporting the work of its subregions. One key effort is the **NJTPA's Freight Rail Industrial Opportunity (FRIO) Corridors Program**, which focuses on systematically identifying and addressing impediments to national standard (286,000 pound, Plate F) rail freight car access and physical constraints. Another initiative is the Freight Concept Development program, which investigates project concepts for eventual funding. Activities include data collection, community outreach, development of potential alternatives to address identified problems and selection of a preferred alternative and a National Environmental Policy Act classification.

Freight is integral to all aspects of the region's economy and is considered in all transportation planning and investment decision making at the NJTPA. In particular, The Connected Corridor document, discussed in the technology section, will seek to support the application of new and existing **technology to improve freight flow, operations, safety and security**. Freight issues will also be important to resiliency efforts discussed in this chapter to sustain supply chains

Secaucus, Hudson County

through major disruptive event. Safety planning must consider reducing crashes involving trucks and ensure that both autos and trucks can move in a safe and efficient manner.

TRANSPORTATION DEMAND MANAGEMENT

Needs & Strategies

Transportation Demand Management (TDM) encompasses a set of strategies that increase transportation system efficiency by emphasizing the movement of people rather than vehicles. By promoting transportation choices (including transit, carpooling, walking, and biking), enhancing connections between transportation modes and providing travelers with comprehensive information, the volume of traffic on roadways can be reduced **Reducing congestion can also improve air quality and health** and the system can become more resilient in the face of short-term disruptions. These benefits keep the region competitive in attracting and retaining employers and the high-quality workforce they rely on.

Livable

◄ Improve health outcomes for the region's residents (Focus Area 12)

Efficient

▶ Enhance and improve existing public and improve transit services (Strategy 7.4)

Efficient

▶ Reduce ransportation petroleum use (Strategy 11.4)

Livable

▶ Use public investment programs to create, connect and strengthen access to opportunity (Strategy 8B.3)

A particular focus of TDM strategies is improving access to the transit system, including getting people to and from transit stations, bus stops and park-and-rides—known as **"first-mile" and "last-mile" connections**. Strategies include shuttle buses and accommodations for walking and biking. Increasingly ride hailing services such as Uber or Lyft are being looked to as an option for these connections, sometimes subsidized by employers or local governments, particularly for elderly and special needs populations, as discussed below. The City of Summit partnered with Uber to launch the state's first commuter ride-sharing program. The program offers rides in lieu of parking to city residents with commuter parking permits and subsidized rides to residents and visitors without permits to address a parking shortage around the NJ TRANSIT station. Other TDM strategies include facilitating car- and van-pools and promoting telecommuting, flextime, pre-tax transit passes and other work-related policies. Carpool matching is provided through a statewide website, njrideshare.com.

New Jersey's eight Transportation Management Associations (TMAs) are dedicated to advancing these and other TDM strategies by working with local governments and companies throughout the region. TMAs also work with residents to provide trip planning assistance, whether by transit, car, bike, or walk; travel training on how to use the transit system for seniors and people with disabilities; and a wide range of pedestrian and bicycle safety programs, including the Street Smart pedestrian safety campaigns and Safe Routes to School. TMAs also work with employers to promote teleworking, flextime, and other **workplace policies that reduce congestion**. They also work with employers new to the NJTPA region or relocating within the region to help their employees reduce their need to commute alone.

Another focus of TDM strategies is helping address **the special mobility challenges facing seniors, low-income people, veterans and people with disabilities**. Lack of the right systems, services and policies can make it difficult for these populations to access employment, health care, education and social support. The NJTPA and its partners throughout the region have prepared a Regional Coordinated Human Services Transportation Plan (CHSTP) that identifies transportation service priorities for meeting the needs of these residents. This plan will help guide NJTPA's long-term TDM priorities. Recommendations include expanding and coordinating customer information sources, **providing travel training** for customers and social service providers, investing in infrastructure for ADA and pedestrian accessibility, providing increased service to critical destinations like Veterans Administration medical facilities and increasing night and weekend hours for human service shuttles where feasible. The plan will help advance the goals of USDOT's Ladders of Opportunity initiatives, a FAST Act emphasis on increased access to essential services for all residents, particularly traditionally underserved communities.

Asbury Park, Monmouth County

Newton, Sussex County

Implementation

Plan 2045 is committed to advancing TDM strategies through NJTPA planning activities and programs. In particular, the NJTPA administers and coordinates the statewide TMA program, and the agency will continue to support and promote TMA work. In addition, NJTPA's programs for supporting subregional planning emphasize advancing mobility solutions that will improve system efficiency, including locally appropriate TDM strategies. Other support for TDM is provided through NJTPA's ongoing leadership in Together North Jersey, which lays the ground work for community-based development that incorporates TDM strategies.

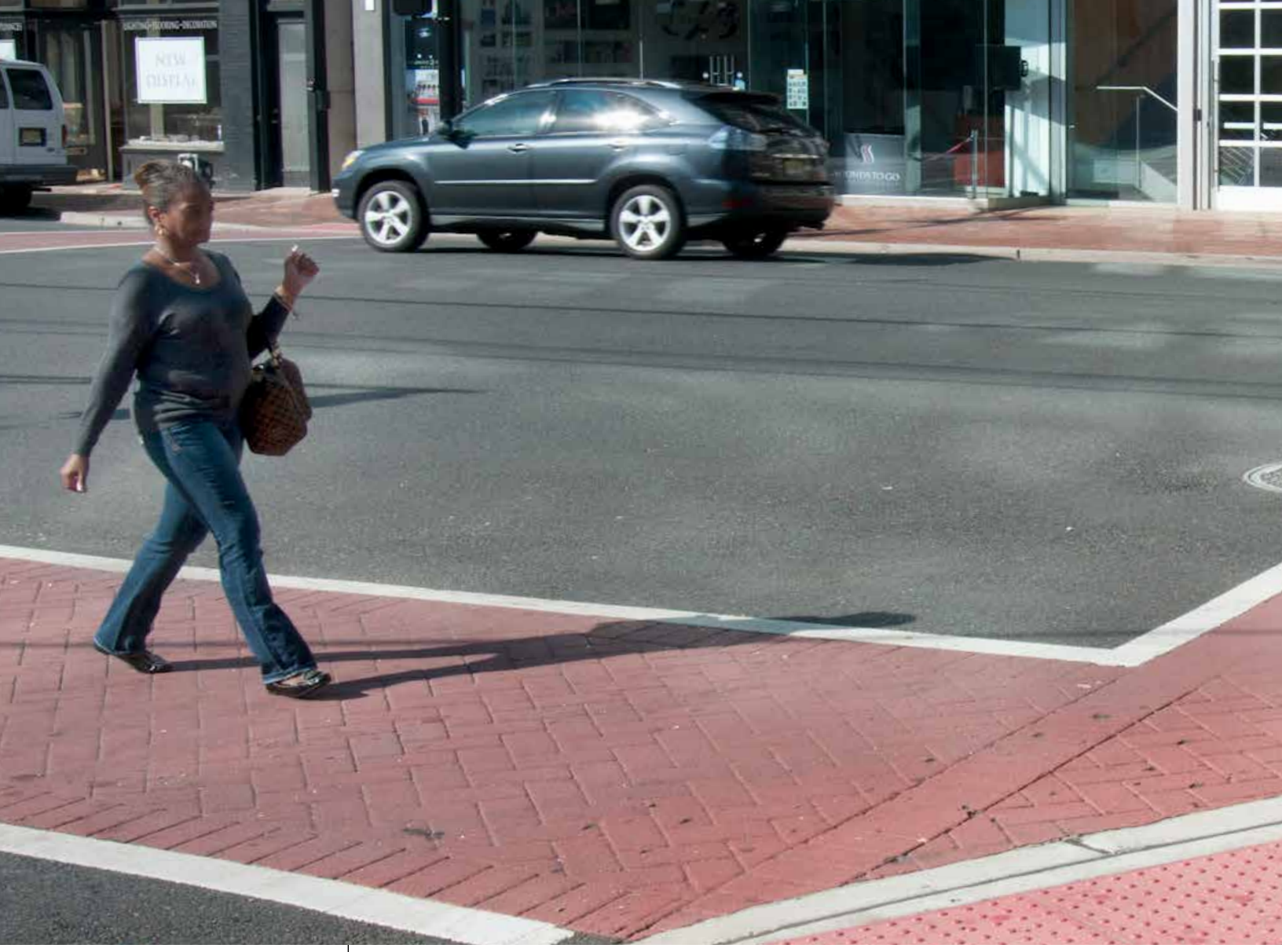
Funding support for shuttle buses is another focus. The NJTPA, in cooperation with NJ TRANSIT, provides federal Congestion Management and Air Quality (CMAQ) funds for a variety of shuttle services across the region. These shuttles play an important role for local mobility in locations that do not have fixed-route, scheduled transit service, providing first mile and last mile connections. Shuttles are operated by county and municipal agencies, non-profit organizations, and by the TMAs. Continued efforts to explore use of ride-hailing services to supplement or replace shuttles and provide on-demand services should be pursued.

Exploring new mobility options will be important in meeting the recommendations of the Regional CHSTP, which, as discussed previously, seeks to address the needs of seniors, low-income people, veterans, and people with disabilities. The NJTPA will work with its partners to advance these recommendations.

It will also seek to coordinate TDM activities with initiatives to improve transportation systems management and operations that employ Intelligent Transportation Systems (ITS) to manage travel demand, as discussed elsewhere in this chapter.

Livable

◄ **Use public investment programs to create, connect and strengthen access to opportunity (Strategy 8B.3)**



Red Bank, Monmouth County

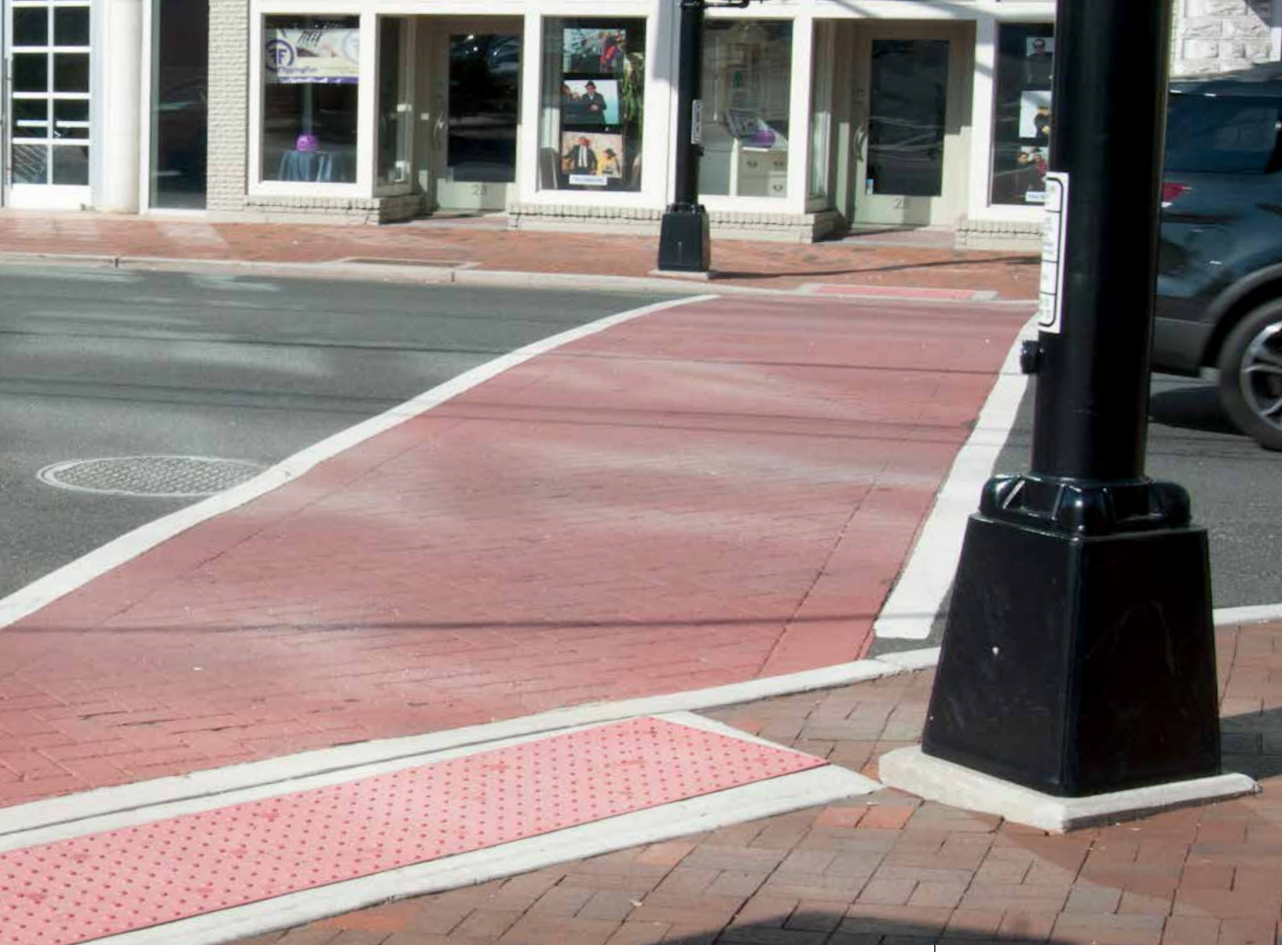
SAFETY

Needs and Strategies

Transportation safety is among the NJTPA's highest priorities. As part of the development of Plan 2045, the NJTPA Board added "Make Travel Safer" to the list of broad goals guiding the NJTPA planning process (see NJTPA Goals p. 8). This goal seeks to "Improve overall system safety, reducing serious injuries and fatalities for all travelers on all modes." To fulfill the goal, Plan 2045 commits to continuing safety investments and support for safety programs in cooperation with partners throughout the region.

But addressing safety issues presents great challenges. Transportation safety involves a complex interaction of human behavior, technology, engineering, education and enforcement as well as the natural environment. And the stakes are high for finding effective solutions. In addition to the tragic human toll of injuries and fatalities, crashes can cause disruptions and delays with far-reaching economic impacts.

Progress is being made. The region's overall crash rates have been steadily declining, even amid growth in both population and vehicle miles traveled. However, crashes resulting in pedestrian injuries and fatalities make up a larger share of the crashes that do occur. Distractions—notably from smart phone use—are



on the rise for drivers and pedestrians alike. Nationally, about 10 percent of fatalities can be attributed to distraction. As mentioned in Chapter 3, FHWA has classified New Jersey as a pedestrian "focus" state and the City of Newark a pedestrian "focus" city because of the high rate of pedestrian fatalities and injuries. The state is also a "focus" state for intersection crashes.

The strategies being pursued by NJTPA to improve safety include the following:

Improving Local Roads Sixty percent of serious crashes and fatalities occur on local county and municipal roads, according to the State's Strategic Highway Safety Plan (SHSP). The NJTPA helps subregions **reduce crashes on county and municipal roadways** through the Local Safety Program, which uses federal Highway Safety Improvement Program (HSIP) funding to support high-impact safety improvements (map, next page). Since 2005, the NJTPA has allocated nearly $100 million for motorist, bicycle and pedestrian safety improvements on local and county roads including installation of upgraded traffic control and pedestrian countdown signals, new signage and crosswalks, reflective striping, and other measures.

To address crashes in rural areas, the NJTPA launched its High Risk Rural Roads Program in 2009. Since then, the NJTPA has allocated more than $16 million

Efficient

◄ Use New Jersey's Strategic Highway Safety Plan to improve transportation safety (Strategy 7.6)

Efficient

▶ **Use New Jersey's Strategic Highway Safety Plan to improve transportation safety (Strategy 7.6)**

▶ **Adopt and implement "Complete Streets" policies (Strategy 7.2)**

Livable

▶ **Create safe and healthy buildings, neighborhoods and communities through planning and design (Strat 12.5)**

▶ **Expand the use of Crime Prevention Through Environmental Design (CPTED) strategies (Strategy 12.6)**

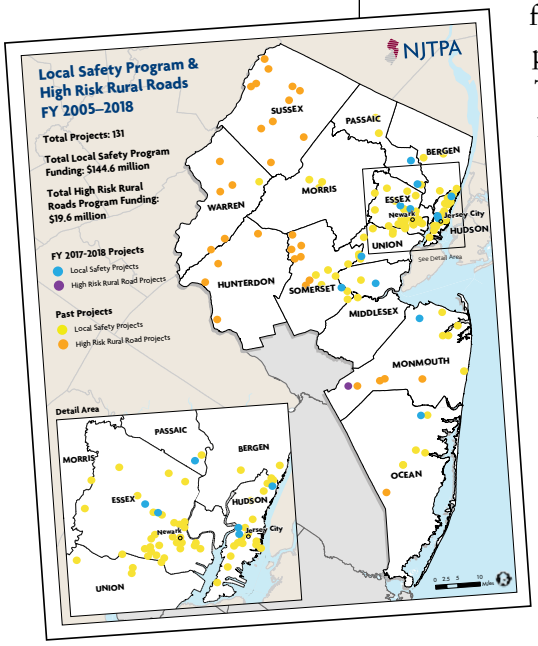
in federal funds to improve safety on crash-prone rural roads. Work supported by this program includes skid-resistant surface treatments, guiderails, reflective pavement markings, rumbles strips and advanced warning signs. The NJTPA also provides planning support to its subregions to meet national standards for signage and road safety and to conduct studies of corridors and high-crash locations. These programs will continue and expand under Plan 2045.

New Jersey's Strategic Highway Safety Plan The NJTPA and a broad coalition of state agencies and safety stakeholders partnered with NJDOT to develop this plan, which was completed in 2015. The plan used a data-driven approach to identify the following priority emphasis areas: lane departures, aggressive driving, drowsy and distracted driving, intersections, mature drivers, and pedestrians and bicycles. Infrastructure improvements prioritized in the SHSP include rumble strips to reduce lane departure crashes; roundabouts and high visibility traffic signals to improve intersection safety, particularly for older drivers; traffic calming or road diets to address aggressive driving and better accommodate pedestrians; and sidewalks or curb extensions to address pedestrian safety needs. **The Safety Plan guides all NJTPA safety planning efforts**.

Pedestrian education and enforcement The **Street Smart NJ pedestrian safety education and enforcement campaign** is supported by the NJTPA in cooperation with the Transportation Management Associations, law enforcement, community groups, local elected officials and schools. Participating communities have grown to more than 60 in 2017. The campaign works to raise awareness of pedestrian and motorist laws and change behaviors that cause crashes, injuries and fatalities (see Street Smart NJ p. 95).

Youth safety The NJTPA, in coordination with the NJTPA and other MPOs in the state, administers the **Safe Routes to School (SRTS) program**, which allocates federal funds to enable and encourage children, including those with disabilities, to walk and bicycle to school. The program funds physical safety improvements (such as crosswalks) as well as pedestrian and bicycle safety education for elementary school children. The TMAs are instrumental in these educational efforts. Street Smart NJ campaigns also include activities at schools and youth centers.

Crime Prevention Through Environmental Design (CPTED) This is a set of principles and strategies that enable inter-disciplinary community teams to **reduce actual and perceived opportunities for criminal activity** by integrating safety considerations into community planning and design. Together North Jersey supported two CPTED initiatives, offering training to community teams in Paterson and Newark that resulted in evaluations and recommendations for enhancing community safety, including potential improvements to pedestrian and transit facilities. NJTPA will seek to expand CPTED training opportunities to other communities.



Asbury Park, Monmouth County

System Security In conjunction with safety programs, NJTPA will continue to work with its partners to fund new strategies, technologies and projects that help prevent and better prepare the region for possible security threats. NJTPA will also work to advance projects that address transportation security; to disseminate information on transportation security; to coordinate with state, county and local emergency operations agencies; and to conduct transportation network analyses to determine the most effective recovery investment strategies.

Implementation

The NJTPA is committed to the ongoing funding of transportation safety programs, projects, studies and educational campaigns that make transportation safer for all users. The RCIS includes investment principles to "Make Travel Safer" and "Support Walking and Bicycling" (see Chapter 4) and calls for NJTPA to allocate approximately 3 percent of overall spending to direct safety improvements, while also fully incorporating safety enhancements in other investments. Safe travel, particularly for walking and biking, are key components of making the region more livable and resilient.

In making safety investments and implementing the safety strategies discussed above, the NJTPA will seek to:

- Expand the capabilities of county and local governments to develop and implement projects through the Local Safety and High Risk Rural Roads programs.
- **Follow the recommended priority improvements** identified in New Jersey's Strategic Highway Safety Plan
- Reduce the region's high rate of pedestrian injuries and fatalities, including by continually recruiting and expanding regional partners in the Street Smart NJ pedestrian safety campaign and related initiatives to improve education and enforcement.

Efficient

◀ Use New Jersey's Strategic Highway Safety Plan to improve transportation safety (Strategy 7.6)

Sparta, Sussex County

- Encourage and support implementation of Complete Streets policies (see sidebar p. 66)
- Integrate safety analysis and design considerations into project concept development studies, subregional planning and TMA work programs.
- Encourage and support safety-related planning through Together North Jersey initiatives including CPTED and other efforts involving arts, housing and other areas.
- Consider freight movement in safety planning studies and programs, including addressing the need for additional truck parking, safeguards at railroad crossings and measures to reduce auto-truck conflicts.

Efficient

▶ Use technology to improve transportation operations (Strategy 7.7)

- Take advantage of the latest **technologies to enhance transportation safety**, including working with the private sector to ensure new technologies (including autonomous vehicles) adequately address public safety.

In all these implementation efforts, the NJTPA will work to bolster its ability to monitor and analyze safety conditions on the transportation system. This will allow it to better fine tune its programs and ensure investments are cost-effective. Already, the NJTPA and its partners collect and make extensive use of crash and other safety data in developing and evaluating Street Smart NJ campaigns, Local Safety/High Risk Rural Roads programs and other efforts. This data-oriented approach to safety is becoming more systematic now that federal requirements for safety performance measures have been implemented.

FHWA recently established five national performance measures for the purpose of carrying out the Highway Safety Improvement Program (HSIP) and for State DOTs and MPOs to use in assessing serious injuries and fatalities, and are discussed in the sidebar.

Street Smart

Pedestrian safety has become a growing concern not only in New Jersey, but across the country. The number of pedestrians killed in vehicle crashes in the United States jumped 11 percent to nearly 6,000 in 2016, according to the Governors Highway Safety Association. And traffic deaths overall—including drivers and passengers—were up 6 percent nationwide that year, according to the National Safety Council.

The FHWA has designated New Jersey a pedestrian safety focus state and Newark as a focus city due to high rates of pedestrian injuries and fatalities.

Engineering—like the NJTPA's Local Safety and High Risk Rural Roads Program—and enforcement can make roads safer for all users, but education is also critical. The NJTPA's Street Smart NJ campaign, first piloted in 2013, is a public education, awareness and behavioral change campaign focused on pedestrian safety. It complements law enforcement efforts in communities throughout New Jersey. Since its inception, more than 60 communities have participated in Street Smart NJ, with the goal of increasing that number to 100 in the coming years.

The campaign has five core messages. Motorists are told to Stop for Pedestrians and Obey Speed Limits, while pedestrians are reminded to Wait for the Walk and Use Crosswalks. A fifth message, Heads Up, Phones Down, encourages both motorists and pedestrians to avoid distractions.

The campaign uses street signs, posters, banners, safety tip cards, coasters, cup sleeves and other materials, along with advertising and social media to encourage pedestrians and motorists to practice these safe behaviors.

Street Smart NJ has proven successful. An analysis of pre- and post-campaign data in 2016 found a 28 percent reduction in pedestrians jaywalking or crossing against the signal and a 40 percent reduction in drivers failing to yield to crossing pedestrians or cyclists.

Toward Zero Deaths

Each year, hundreds of people die in crashes on New Jersey's roads. The state's Strategic Highway Safety Plan adopted a "Towards Zero Deaths" approach to safety, which states that even one traffic-related death is unacceptable. USDOT promotes a "Toward Zero Deaths" approach, while New York City, Boston and other cities have adopted "Vision Zero."

The idea of "zero deaths" may seem highly ambitious, but it is based on the idea that all crashes are preventable if the right mix of leadership, policies, engineering improvements, education and enforcement are applied together. In 2016, the National Safety Council, the National Highway Traffic Safety Administration, FHWA and the Federal Motor Carrier Safety Administration announced their partnership in the "Road to Zero" initiative, which aims to eliminate traffic fatalities within 30 years. The "Road to Zero" partnership expands beyond transportation agencies to include non-profit groups and technology companies in this coordinated approach to highway safety.

Newark, Essex County

These safety measure target-setting efforts, together with technologies providing new sources of real time data, will allow NJTPA its regional partners to continue the progress being made ensuring a safe and reliable transportation network for all users.

BICYCLE/PEDESTRIAN SAFETY & CONNECTIVITY

Needs and Strategies

Walking and biking are integral to regional mobility and contribute to quality of life, economic vitality, healthy living and environmental protection. The NJTPA continues to make increasing the share of walking or bicycling trips a priority, as reflected in the RCIS Investment Principle to "Support Walking and Biking."

Less than 4 percent of work trips and only 10 percent of non-work trips in the region are made by foot or bicycle. This varies significantly around the region. For example, 9 percent of work trips in Hudson County are made by cycling or walking, while only 1 percent of people in more rural areas like Sussex County walk or bike to work.

Walking and biking are becoming more popular each year, and the demand for safer bicycle and pedestrian facilities is growing. Across all age groups, fewer

Americans are getting drivers licenses, according to a recent study by the University of Michigan Transportation Research Institute. Upgrading facilities to allow bicyclists and pedestrians to safely and conveniently reach transit, shopping, employment, entertainment, and service locations is a NJTPA priority. This supports overall economic development and is particularly important for low-income communities where many people depend on walking and biking for transportation.

Streets with good **bicycle and pedestrian infrastructure strengthen communities** by enhancing safety, equity and civic life. As discussed previously, this plan supports Complete Streets policies, which encourage making walking and biking an attractive mode for short trips and recreation, and creating transportation independence for those who do not drive, such as children, elderly and disabled populations.

Bike share programs are a promising new strategy in densely populated areas. Bike sharing is an innovative way for people wanting to make bicycle trips to simply pick up a bike, use it, and return it within the share system's service area. Bike shares are often combined with other transportation modes (e.g. transit). In Hudson County, Hoboken and Jersey City have bike share programs and Rutgers University is in the process of launching a bike share program concentrated around its New

Livable

◄ Create safe and healthy buildings, neighborhoods and communities through planning and design (Stratregy 12.5)

Livable●

▶ Improve health outcomes for the region's residents (Focus Area 12)

▶ Create vibrant places and neighborhoods that will attract and retain residents, workers, and visitors (Focus Area 6)

▶ Create vibrant places and neighborhoods that will attract and retain residents, workers, and visitors (Focus Area 6)

Efficient●

▶ Reduce ransportation petroleum use (Strategy 11.4)

Brunswick campus. Asbury Park in Monmouth County also has a bike share programs.

Residents throughout the region are increasingly walking and biking as part of **active, healthy lifestyles**. Plan 2045 supports development of trails that provide opportunities for walking and cycling. Such facilities can link communities, provide recreation and create alternatives to driving. Better connections among modes of transportation, such as transit with cycling, enable residents to get the benefits of walking and bicycling through their daily activities. Moreover, as zero-emission transportation modes, walking and biking contribute to improved air quality and help protect the environment.

Implementation

The NJTPA will continue to support infrastructure improvements that make biking and walking safer and to improve access to transit for cyclists and pedestrians. Efforts are also underway to create more walking and cycling trails throughout the region, and to create connections between trails and to recreational, employment, residential and other destinations.

The NJTPA will pursue various measures to support walking and biking, including:

- Assisting counties and municipalities with Complete Streets policy development and implementation. This includes land use policies that support walking and biking through **mixed-use development**, particularly in downtown areas and at transit hubs.
- Working with subregions to incorporate bicycle and pedestrian projects into the Transportation Improvement Program (TIP).
- Providing funding for subregional bicycle and pedestrian planning studies.
- Continuing the **Planning for Emerging Centers program**, which assists municipalities in planning for more sustainable, transit-supportive and walkable communities.
- Encouraging expansion of bicycle and pedestrian access to transit, including the installation of bike racks and lockers at stations and other accommodations.
- Supporting expanded bicycle trails and designated bicycle routes including the East Coast Greenway, Morris Canal Greenway (see Morris Canal Greenway p. 105), Union Transportation Trail and 9/11 Memorial Trail.
- Working with partner agencies to ensure improvement projects are designed to **enhance walking and biking opportunities** whenever feasible.
- Continuing to work with partners in Together North Jersey to coordinate efforts to improve walking and biking around the region.

As discussed in the safety section, the NJTPA is also actively engaged in the Street Smart NJ pedestrian safety public education campaign, which aims to improve driver and pedestrian behaviors to make streets safer for everyone. (See Street Smart page 95). The NJTPA will seek to expand this and other educational activities to enhance walking and biking opportunities.

Montclair, Essex County

Ringoes, Hunterdon County

Safety Performance Measures

FHWA established five national performance measures for State DOTs and MPOs to use in assessing serious injuries and fatalities. These performance measures are the five-year rolling averages, on all public roads, of: number of fatalities; rate of fatalities per 100 million vehicle miles traveled (VMT); number of serious injuries; rate of serious injuries per 100 million VMT; and number of non-motorized fatalities and non-motorized serious injuries.

NJDOT, in collaboration with NJTPA, the two other MPOs in the state and the New Jersey Division of Highway Traffic Safety, set annual targets for each of these measures for 2018. The 2018 targets were set after analyzing past trends in crash data and are consistent with the New Jersey Strategic Highway Safety Plan (SHSP) long-term Towards Zero Deaths goal of reducing serious injuries and fatalities by 2.5 percent each year. These targets, together with technologies providing new sources of real time data, will allow NJTPA and its regional partners to continue the progress being made ensuring a safe and reliable transportation network for all users.

Aftermath of Superstorm Storm in Lake Como, Monmouth County

RESILIENCY, CLIMATE CHANGE & AIR QUALITY

Needs and Strategies

The changes in global climate that are projected to occur in coming decades will have a significant impact on the region's transportation infrastructure. The region is expected to see more frequent and intense extreme weather events, rising sea level, record rainfalls, frequent inland and coastal flooding, above average temperatures and more frequent "ozone alert" days. This must all be considered when planning for the future.

The crippling effects of Hurricane Irene and Superstorm Sandy highlighted the need for improved resiliency for the entire multi-modal transportation system. Sandy left a great swath of damage to homes, businesses, the electrical grid and transportation systems across the region. The damage to transportation infrastructure was in many cases unprecedented, severing links critical to the region's mobility, economy and way of life. Years later, the region continues to recover and rebuild from Sandy. The region has also experienced nor'easters that flooded roads, making them impassable and forcing evacuations.

Infrastructure needs to be able to withstand environmental and other disruptions and to quickly resume normal operations. In addition to the impacts of major

storms, more frequent lesser storms and sea level rise will make inundated roads and nuisance flooding more common in the future, leading to regular road closures and ongoing damage and disruption.

The NJTPA will continue to work with partner agencies to assess vulnerabilities and prepare investments and emergency plans to ensure resiliency. Coordinating across state and regional lines is particularly important given the potential for widespread impacts. One notable effort is NJTPA's participation in FHWA's Post Hurricane Sandy Transportation Resilience Study in NY, NJ and CT conducted through a partnership with agencies in the three states, including NJ TRANSIT and the Port Authority of New York & New Jersey. Recommendations of this study must be addressed in ongoing planning and investments. Example strategies include climate-risk-adjusted benefit-cost analyses during the planning phases for adaptation strategies and programming adaptation strategies at appropriate time frames given the possible pace of climate change.

Study of vulnerabilities and resiliency strategies within the region are also important. For example, the NJTPA is coordinating a study to **develop a climate resilience and adaptation plan** for the New Jersey portion of the Passaic River Basin. Other study and planning efforts have been undertaken along

Resilient

◄ **Identify the region's vulnerabilities to extreme weather and climate change (Strategy 10.1)**

the Jersey Shore and flood-prone areas with involvement of NJTPA subregions. Together North Jersey has also sponsored local studies to explore resiliency, such as in Jersey City and Hoboken. Similar systematic study efforts must continue and be expanded to other areas with greater involvement of local officials and the private sector.

Strategies to address vulnerabilities identified through resiliency studies must be adapted to the circumstances in each locale and on specific facilities. Strategies include:

- Engineering solutions to retrofit bridges and other infrastructure such as the installation of berms and raising of walls to protect the approaches to Route 37 in Ocean County and Route 7 in Hudson County from flooding, as examined during the FHWA resiliency study.
- Building projects with design standards that provide greater protection. For example, protecting roadway embankments from failures due to high winds and flooding and using pavement materials that can withstand extended high temperatures
- Enhancing systems operations, which involves incident management with emergency alerts and messaging about transportation alternatives.
- Collaborating and coordinating among transportation providers, including Transportation Management Associations that operate shuttles and vanpools.
- **Addressing roadway flooding** with gray infrastructure, such as porous pavement; green infrastructure, such as bioswales, which are landscaped areas that collect stormwater; and streetscapes that minimize pavement and use street-tree pits to facilitate infiltration and detention of runoff.

Resilient●

▶ Improve management of stormwater runoff and use green infrastructure solutions to mitigate the impacts of extreme weather and climate change (Strategies 10.4 and 14.1)

A larger regional strategy involves planning and building system redundancy. This may take the form of emergency management plans that designate alternative evacuation routes or physical upgrades to parallel routes and facilities. The latter can be expensive but may be justified on heavily traveled corridors. One high priority example is the need for redundant rail access to New York City, which would be achieved by the Hudson Tunnel Project, which supports the Gateway Program (see Trans-Hudson Travel p. 58).

Air quality is another key area of concern in the region. The NJTPA has responsibility under federal law for overseeing and supporting efforts to reduce emissions from the transportation sector. This includes using computer modeling to demonstrate that projects in its Transportation Improvement Program (TIP) and long-range transportation plans, like this one, have a net positive impact on air quality and conform to the state goals for achieving its federally mandated standards (called air quality conformity). The NJTPA also has responsibility for allocating federal Congestion Mitigation and Air Quality (CMAQ) funding for projects that reduce emissions and work to improve air quality.

Mantaloking, Ocean County

Numerous strategies discussed elsewhere in this chapter can reduce regional emissions, particularly by cutting the number, length and duration of vehicle trips. They include: encouraging the use of public transit and ridesharing; addressing congestion with upgraded road designs, adaptive traffic signals and other improvements; encouraging development that accommodates walking and biking; and many others. In addition, new technologies discussed in this chapter also can

Transportation Clean Air Measures

The NJTPA continues to fund innovative projects to **reduce transportation-related emissions** through its Transportation Clean Air Measures (TCAMs) Program supported by federal Congestion Mitigation and Air Quality (CMAQ) funds. With guidance from the NJTPA Board and a Technical Advisory Committee, and working closely with regional and local partners, the NJTPA has advanced many priority TCAMS including:

Local Traffic Signal Optimization/Adaptive Project

By more efficiently managing traffic, the systems—as implemented in Ocean County and slated for Newark and Hackensack—have realized significant reductions in congestion, travel time and emissions.

North Jersey Regional Truck Replacement Program

Identified in the PANYNJ's Clean Air Strategy, this program replaces older, polluting drayage trucks (service from an ocean port to a rail ramp, warehouse, or other destination) that serve marine terminals with newer cleaner models. All old trucks are scrapped.

Fleet Modernization & Replacement Program for Cargo Handling Equipment

Identified in the PANYNJ's Clean Air Strategy, this program is replacing about 100 yard tractors and similar pieces of cargo handling equipment at the Port Authority's Marine Terminals with cleaner equipment versions, including alternative powered equipment.

Livable

◄ Improve conditions for communities that are disproportionately burdened by air pollution (Strategy 12.7)

Marine Vessel Repower Program

This program replaces older marine diesel engines with new cleaner versions. Currently this New Jersey Department of Environmental Protection program includes two high-speed catamaran ferries, one excursion vessel, and three commercial fishing vessels.

Ridgefield, Bergen County

improve air quality, including encouraging use of alternative fuel vehicles and systems to achieve more efficient freight distribution. All these efforts also are valuable in helping to reduce greenhouse gas emissions, which must remain a regional priority in cooperation with state and local agencies.

The NJTPA is working with communities and organizations in the region to encourage use of alternate fuel vehicles. The NJTPA is partnering with three pilot municipalities (Montclair, Secaucus and Woodbridge) to develop local readiness plans to facilitate the use of electric and natural gas vehicles in those communities. The plans will consider how municipal regulations and infrastructure can be improved

to advance the use of alternative fuel vehicles, including a review of local zoning and land use ordinances, permitting requirements and potential locations for infrastructure. In addition, some general guidance is being developed for any town to use.

Implementation

The recognition of regional vulnerabilities after Sandy resulted in greater commitments by the NJTPA and its partner agencies to integrate resiliency into all transportation planning and programming activities. For Plan 2045, the NJTPA added an RCIS resiliency principle which states, "Investments should be made to mitigate risks associated with climate change, extreme weather, homeland security, and other threats. Investments should consider criticality of infrastructure, vulnerability and level of risk."

In keeping with this principle, the NJTPA will pursue the following measures to implement the resiliency strategies discussed above:

- Continue to fund capital projects to address damage from Sandy and prepare roads, the transit system and other infrastructure for future events;
- Work with partners to address recommendations of the FHWA study following Sandy and other resiliency studies.
- Support and assist efforts to address the resiliency recommendations of the Together North Jersey plan, including working with partners through the Together North Jersey resiliency task force.
- Encourage resiliency to be considered in all subregional and TMA grant and study programs administered by the NJTPA.
- Work with state and local emergency management agencies to assist in preparing plans for disruptive events and minimizing impacts.
- Advance the use of alternative fuel vehicles by encouraging communities to adopt compatible local zoning and land use requirements and install fueling infrastructure, following guidance drawn from NJTPA's alternative fuel pilot projects.
- Continue funding **projects that reduce emissions and improve air quality** through the Transportation Clean Air Measures Program (see Transportation Clean Air Measures p. 103). These have included replacement of trucks and construction vehicles with lower-emissions equipment; installation of cleaner-burning ferry engines; and installation of adaptive traffic signal systems.
- Update the Regional Greenhouse Gas Inventory and Mitigation Plan. This data can assist in evaluating strategies to reduce greenhouse gas emissions in all phases of transportation project development.

For all these measures, the NJTPA will seek to involve a wide range of public and private partners in keeping with NJTPA's role as coordinating body, forum for information exchange and data repository. Additionally, certain Sandy recovery projects will be completed in the near term by the Port Authority and NJ TRANSIT, including repair, restoration and replacement of damaged facilities, replacement of damaged equipment, hardening of certain facilities, backup equipment purchases and creation of a microgrid for NJ TRANSIT.

Livable

▶ Improve conditions for communities that are disproportionately burdened by air pollution (Strategy 12.7)

Franklin Township, Somerset County

Little Falls, Passaic County

Clifton, Passaic County

Morris Canal Greenway

Pedestrians and cyclists could one day be able to closely follow the route of the historic Morris Canal, winding their way from Liberty State Park along the Hudson River to the Delaware Water Gap.

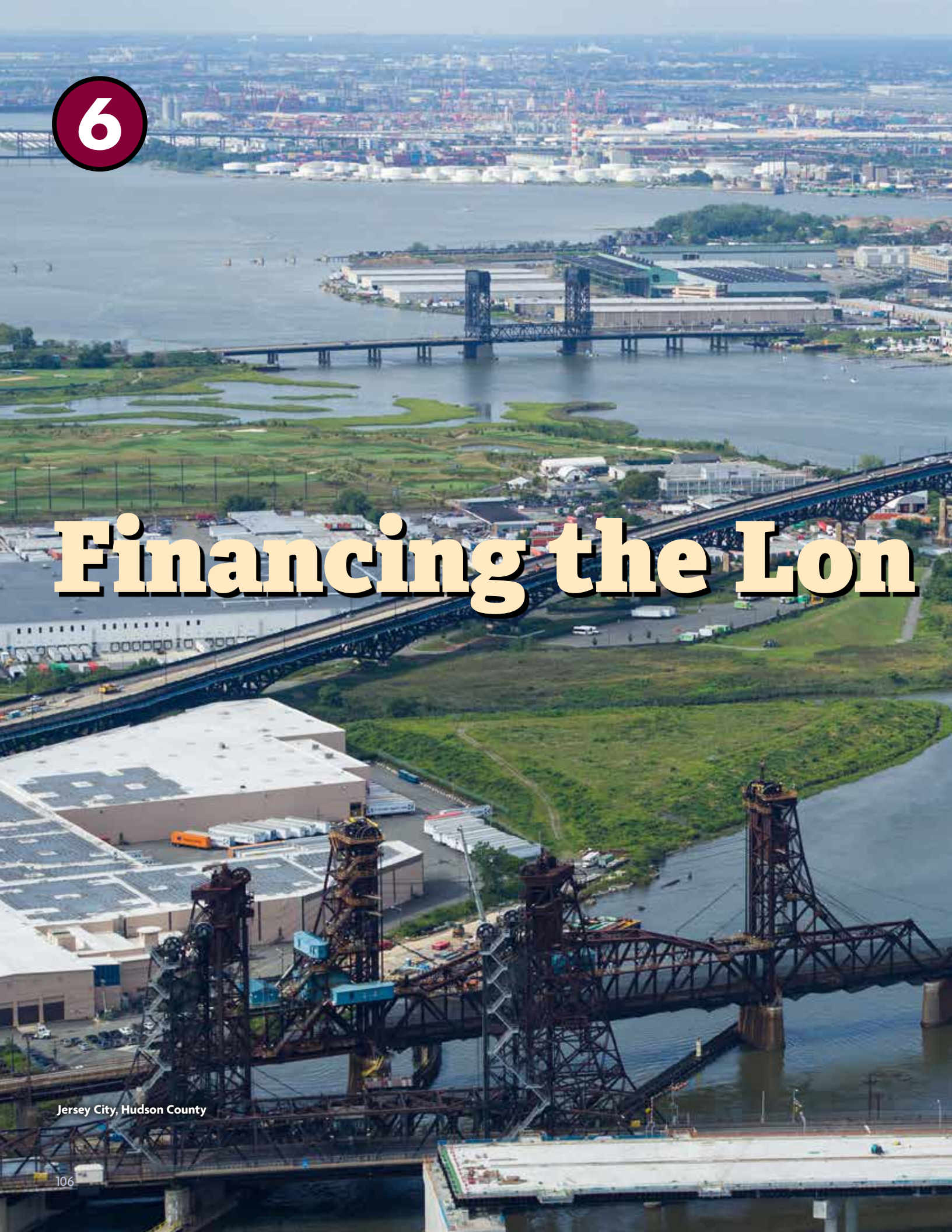
The NJTPA launched a year-long study in July 2017 to explore the steps necessary to create a public greenway that spans six counties in North Jersey.

Some portions of the canal have been preserved, like Waterloo Village in Byram Township, Sussex County. Visitors can explore the restored buildings and walk along the canal path, getting an idea of what life was like in a 19th century canal town. In other places along the canal's route, county and local officials have worked to create parks and trails. But these trails lack linkages and much of the canal pathway remains incomplete and inaccessible.

The Morris Canal Greenway Corridor Study will build on past planning studies supported by the NJTPA. It brings together a broad group of stakeholders, including local, county and state officials, non-profit organizations, community groups and members of the diverse Morris Canal Working Group, which is dedicated to preserving and celebrating the historic canal.

The canal was a technological marvel when it opened in the early 1830s. Through a series of 23 lift locks and inclined planes, the canal overcame an elevation change of 1,674 feet, carrying coal 102 miles across North Jersey from the Delaware River to New York Harbor.

By the early 1900s trains made the canal obsolete. Although it shut down in 1924, the canal remains an important part of the region's history. Segments of the canal have also found new life as a popular recreational greenway in several communities.



6

Financing the Lon

Jersey City, Hudson County

g-Range Plan

Plan 2045 describes the substantial transportation infrastructure needs facing the NJTPA region and identifies a comprehensive range of highway, transit, freight, pedestrian, bicycle and other multimodal improvement projects and programs to address those needs. This chapter provides a financial plan for implementing these projects and programs. ● Plan 2045's financial assumptions and identified improvements were developed in part through an analysis of two sets of possible future scenarios, as discussed in Chapter 4. One set of exploratory scenarios considered emerging trends and potential game changers in demographics, economics, the environment, behavior, and technology to inform an update to the Regional Capital Investment Strategy (RCIS), which identifies priorities for allocating resources across modes and among categories of projects and programs, including system preservation, management and targeted expansion. A second set applied the RCIS and identified the affects of three funding levels—Plan 2045 Scenario, Limited Funding Scenario and Aspirational Funding Scenario. ● The Plan 2045 Scenario relies upon reasonably anticipated funding over the life of the plan, and the level of investment is consistent with historical trends in federal and state transportation funding. The funding levels in the Plan 2045 Scenario fall between annual increases less than projected inflation (the Limited Funding Scenario) and substantially greater funding that could be used for a larger set of

Wanaque Reservoir, Passaic County

projects (the Aspirational Funding Scenario).

This chapter explains the assumptions and strategies, and projected revenues and expenditures within the Plan 2045 Scenario, which serve as the financial element underpinning this plan. Under this scenario, the plan primarily targets achieving and maintaining a state of good repair for North Jersey's vast multimodal transportation network. It includes select capacity and operational improvements to accommodate future growth and anticipates use of new technologies that improve system efficiency. The Plan 2045 Scenario was developed following the guidance of the NJTPA Board of Trustees, in collaboration with planning partners, and in keeping with the transportation priorities of the Together North Jersey plan. It identifies traditional and non-traditional revenue sources to implement a program of infrastructure improvements to keep freight and people moving. It also calls for streamlining project delivery.

This chapter also includes discussion of the Limited and Aspirational funding scenarios as potential alternative financial futures for the region.

Regional Outlook

Historic and current economic trends play a large role in estimating the revenues available for transportation through 2045. This financial plan takes a conservative approach when forecasting the latter years of the planning horizon by basing revenue growth on projected inflation and within the historical average annual revenue growth rate, with additional funds for anticipated critical projects. The approach reflects historical growth trends and reasonable future expectations for key revenue sources, including state and federal gas excise tax revenues, which are historically the major source of revenue for transportation infrastructure.

Existing fuel taxes do not keep pace with increasing transportation needs. In addition, as vehicles become more fuel efficient, they consume less gasoline, reducing revenues from fuel taxes. These factors combined will necessitate, over time, either an increase in the tax rate against those sources, the identification of new revenues, or both. Potential alternative revenue sources are provided at the end of this chapter.

New Jersey derives economic strength from its position as a focal point for international trade and domestic goods movement, its appeal to corporate and financial services sectors tied to the larger New York-New Jersey-Connecticut metropolitan region, and its

tourism sector. New Jersey's beaches are a major contributor to the tourism sector. A robust regional transportation network, many high quality colleges and universities, and access to abundant and diverse lifestyle amenities such as parks and open space, cultural and entertainment venues, and retail and restaurant districts support New Jersey's economic strength, despite tax and cost of living challenges. These factors should continue to contribute to sustained revenue growth that can support the investment needs in this plan.

As discussed in Chapter 3, projections for population and employment in Plan 2045 point to increases in travel demand on all aspects of the transportation network. The NJTPA forecasts that total non-agricultural employment in North Jersey will increase by about 0.4 percent annually, or about 14,000 jobs per year, while population growth will average about 0.5 percent annually, adding about one million residents by 2045.

Technological advances such as Intelligent Transportation Systems (ITS) and autonomous vehicles will make the system more efficient and able to accommodate some increased demand. However, the region will still need to address potentially greater congestion, wear to roads and bridges, inadequate transit capacity, and other challenges. These increasing needs provide the context for the scenarios discussed in this chapter—that is, any level of future funding will have to address a steadily growing agenda of needed investments.

Long-term economic projections are particularly important in preparing the financial plan because of federal requirements that the plan be based on year of expenditure dollars (YOE $). This means future expenditures and revenues must be adjusted to reflect the impact of inflation. As measured by Rutgers University's R/ECON forecasts, the annual rate of consumer inflation for New Jersey is expected to be 2.5 percent over the life of Plan 2045.

Although the financial plan is largely informed by economic and demographic projections, there are many factors that could impact funding levels and transportation investment needs. The exploratory scenarios discussed in Chapter 4 considered emerging trends and potential game changers in demographics, the economy, climate, location and travel decisions, and technology to inform the RCIS that is incorporated into this financial element. However, the timing and nature of changes over a 28-year forecast period is highly uncertain. Monitoring these changes over time will inform future long range regional transportation plans.

Revenue Challenges and Opportunities

Federal and state motor fuel taxes are the primary revenue sources for the region's transportation investment. Federal motor fuel taxes, along with other taxes and federal general fund contributions, are deposited into the Highway Trust Fund (HTF) and the Mass Transit Account (MTA). North Jersey receives a portion of these funds pursuant to the federal surface transportation program currently authorized by the FAST Act, which was adopted in 2015 and runs through 2020.

While the five-year FAST Act provided predictable federal transportation funding for the first time in many years, the federal program still faces significant revenue challenges. Motor fuel tax collections have not kept up with the program's needs. Among the reasons: the federal gasoline tax has not been raised since 1997; and motor fuel consumption continues to fall due to more fuel efficient vehicles, the use of alternative fuels and less driving associated with changing lifestyles and an older population, as described in Chapter 3. In recent years, Congress

Newton, Sussex County

has used appropriations from the general fund and selected non-transportation revenue sources to cover the federal funding gap.

State transportation funding also principally relies on motor fuel taxes, along with the petroleum products gross receipts tax, a portion of the sales tax, and contributions from the New Jersey Turnpike Authority, all of which are deposited into the New Jersey Transportation Trust Fund (TTF). State legislation enacted in 2016 raised the motor fuels tax and petroleum products gross receipts tax from a combined 14.5 cents per gallon to 37.1 cents per gallon. This represents a significant funding increase that helps the state and the NJTPA region to put resources towards much-needed investments to address the backlog of needs over the next eight years. In addition, by voter approval, all motor fuels tax revenues are now constitutionally dedicated for transportation purposes. Tolls from the Port Authority of New York & New Jersey's interstate crossings as well as the Garden State Parkway and New Jersey Turnpike support these critical regional facilities, which do not typically receive state or federal transportation funding for improvements.

The period to 2045 will include multiple reauthorizations for federal and state transportation funds. It is anticipated that federal and state elected officials will continue to support funding for the vast majority of the region's transportation needs given the long-term history of support for these projects and programs. It is also likely that, over the long run, project delivery methods and revenue sources will evolve to include more public-private partnerships. There will be less reliance on fossil fuel based revenues, and other creative ways will be instituted to meet critical transportation needs.

Cranford, Union County

Revenue Assumptions and Projections

The state's FY 2018 Transportation Capital Program (TCP) allocates $29.5 billion in state and federal funding to the NJTPA region over ten years. The region receives about $1.4 billion in additional funds from various sources to support its portion of NJ TRANSIT operating costs.

The NJTPA has worked closely with NJDOT, NJ TRANSIT, the Port Authority of New York & New Jersey, the New Jersey Turnpike Authority, and other partner agencies to assess the long-term funding and expenditure needs for the region and to determine the appropriate assumptions about future transportation funding.

As part of the financial planning process, the three revenue scenarios mentioned above were developed to examine impacts of various potential capital funding levels.

The impact of these scenarios on various initiatives—such as trans-Hudson rail improvements and reducing the backlog of road and bridge needs—is addressed in the expenditures section later in the chapter. The results of scenario analysis, including both computer modeling and qualitative assessment to estimate regional impacts, were addressed in Chapter 4.

Common Funding Assumptions

The revenue forecast covers the period from FY 2018 through FY 2045. For the FY 2018—FY 2027 period all three scenarios incorporate the funding assumptions from the TCP. The combination of state and federal funding in the TCP averages $2.9 billion annually over the 10 year period, and includes funding for initial work to replace the Portal North Bridge. However, on top of the TCP, there is additional funding in the Plan and Aspirational scenarios to continue work on the Portal North Bridge and initial funding for advancement of a new Hudson River rail tunnel.

Driscoll Bridge, Middlesex County

In addition, all three scenarios include the near-term completion of certain Superstorm Sandy recovery projects.

Beginning with FY 2028, revenues and expenditures differ for each scenario based on assumed revenue growth rates and special large-scale investments. Allocations are in accordance with the RCIS for all three scenarios, excluding special large-scale investments.

The forecast utilizes three different time periods to illustrate changes throughout the duration of the 2045 plan. The time periods are:

- Near-Term (FY 2018-FY 2021)
- Mid-Term (FY 2022-FY 2027)
- Long-Term (FY 2028-FY 2045)

The near- and mid-term elements of the capital funding projections are largely based on NJDOT and NJ TRANSIT revenue assumptions for the NJTPA region. Federal and state funds will continue to provide most of the resources for the region's transportation needs. A small portion of funding is made up of other funding sources, including programmed contributions from the Port Authority, New Jersey Turnpike Authority and Metro-North, which provides funding support for shared commuter rail services with NJ TRANSIT. To meet projected revenue increases over the long term in each of the three scenarios, as stated previously, the federal and state governments will need to address the declining funding power and actual revenue stream from per-gallon fuel taxes and replace or supplement them with new and sustainable revenue sources.

Plan 2045 Scenario Capital Funding Assumptions

The average annual funding increases in the Plan 2045 Scenario are intended to be substantial but reasonable, fulfilling critical regional requirements while remaining politically feasible. In this scenario, state and federal funding levels are based on the FY 2018-FY F2027 TCP, and funding increases at an average rate of 2.5 percent annually between FY 2028 and FY 2045 (Table 6-1), with funding for large projects layered on top of this base. This annual rate is consistent with the long-term inflation forecast for New Jersey over the Plan 2045 period, taking into account population and employment growth. Additional funding above the base is assumed to come from sources identified in the Portal North Bridge Core Capacity Financial Plan in the short- and medium term, as well as significant Federal Transit Administration

Capital Investment Grant funding of $100 million per year beginning in FY 2028, which grows with inflation. This level of Capital Investment Grant funding is matched with an equivalent amount of state or non-federal funds. Including additional federal, state and other funding anticipated for replacement of the Portal North Bridge, construction of a new Hudson Tunnel (for commuter and regional rail) and rehabilitation of the existing Hudson Tunnel, the total capital funding available under the Plan 2045 Scenario (for the period FY 2018 to FY 2045) is YOE $112.8 billion (Table 6-2). To summarize, the revenue assumptions underlying the Plan 2045 Scenario are as follows:

- Near- to mid- term revenues are based on the FY 2018-FY 2027 NJDOT and NJ TRANSIT 10-year capital plans. These plans are based on average annual federal funding level of $1.1 billion-$1.5 billion, and average annual state funding level of $1.5 billion through FY 2027. Funding for Sandy recovery projects, Portal North Bridge and a new Hudson Tunnel is layered on top of this base.
- Long term (FY 2028-FY 2045) baseline federal and state funds combined increase annually by 2.5 percent. Funding for a new Hudson Tunnel are layered on top of this base.
- $100 million Capital Investment Grant funding and non-federal match starting in FY 2028, which grow by 2.5 percent per year.

Table 6-1:
Summary of Capital Funding Assumptions
Base Average Annual Revenue Growth Rates FY 2028—FY 2045*

Plan 2045	2.5%
Limited funding scenarios	2.0%
Aspirational funding scenarios	3.5%
Deflation Factor	2.5%

*In addition to the base average annual revenue growth rate noted above, the Plan 2045 Scenario includes $100 million in CIG funding with an equivalent match from non-federal sources that grows by 2.5% annually and funding for Sandy recover projects, Portal North Bridge and Hudson Tunnels. The Aspirational Funding Scenario also includes $150 million CIG funding and equivalent non-federal match beginning in 2028 that grows by 3.5% annually and funding for Sandy recovery projects, Portal North Bridge, Hudson Tunnels and the full Gateway Program. Deflation factor is used to convert year of expenditure revenues and costs to base year dollars.

Table 6-2:
Summary of Capital Funding Assumptions
Total Revenues (millions, year of expenditure dollars)

Year-of-Expenditure Dollars	*Plan 2045*	Limited	Aspirational
Federal	56,142	43,983	67,434
State	55,698	49,357	73,762
Other	950	930	993
Total	**112,790**	**94,270**	**142,189**
Increase (or decrease) over *Plan 2045* Scenario		**(16.42%)**	**26.07%**

*Other includes Port Authority of New York and New Jersey, New Jersey Turnpike Authority and Metro-North contributions

Limited Funding Scenario Capital Funding Assumptions

The Limited Funding Scenario assumes state and federal funding levels consistent with the FY 2018-2027 TCP. Beginning in FY 2028, state and federal funds grow annually at an assumed rate of 2.0 percent (Table 6-1). This rate falls below the forecasted rate of long-term inflation and approximates the inflation rate observed during the 2005-2015 period, which included historically low rates during and after the Great Recession, followed by a period of economic recovery. No Capital Investment Grant (CIG) funding is assumed in the long term for this scenario.

As discussed in the expenditures section below, this constrained funding in the near- and mid-term will be sufficient to support a maintenance-oriented mix of projects and programs. However, funding will fall short in meeting the demands of regional growth, particularly in funding potential transit system expansion.

Total capital funding over the Plan 2045 period (FY 2018-FY 2045) in the Limited Funding Scenario is estimated to be $94.3 billion, which is 16.4 percent less than the Plan 2045 level (Table 6-2). To summarize, the revenue assumptions underlying the Limited Scenario are as follows:

- Near- to mid- term revenues are based on the FY 2018-FY 2027 NJDOT and NJ TRANSIT 10-year capital plans and completion of Sandy recovery projects.
- Long term (FY 2028-FY 2045) baseline federal and state funds combined increase annually by 2.0 percent.
- No CIG funding is assumed in the long term.

Morristown, Morris County

Aspirational Funding Scenario Capital Funding Assumptions

The Aspirational Funding Scenario assumes the same funding level as the Plan 2045 Scenario for the FY 2018-FY 2027 period, and a substantial increase starting in FY 2028 with a 3.5 percent annual rate of revenue growth for the base funding amount (Table 6-1). Although higher than in the previous two scenarios, this rate is nonetheless a reasonably conservative figure, in between the pure inflation rate of 2.5 percent and the historical transportation revenue (including federal and state funding sources) growth rate of 4.5 percent observed between 1998 and 2015. Layered on top of this base, the NJTPA region receives $150 million per year in federal CIG funding beginning in FY 2028, which grows by 3.5 percent annually. This level of CIG funding is matched with an equivalent amount of state funds also growing by 3.5 percent annually. Additional federal, state and/or other non-federal funding is also received over the course of the Aspirational Scenario time period for completion of Sandy recovery projects, the Portal North Bridge replacement, a new Hudson Tunnel, rehabilitation of the existing Hudson Tunnel, and the full Gateway Program, which calls for a series of improvements between Newark Penn Station and Penn Station New York (see Trans-Hudson Travel p. 58). The total capital funding available under the Aspirational Funding Scenario is $142.2 billion, which is 26.1 percent greater than the Plan 2045 Scenario funding level (Table 6-2). The cost of the full Gateway Program is subject to refinement, which may impact this total.

Achieving this substantial increase is not unprecedented. Legislation underwriting the interstate highway system and the creation of state and federal transportation trust funds occurred during periods of economic expansion when elected officials and the public recognized the importance of providing adequate and stable funding sources for transportation. Future economic expansion could reasonably underwrite a new era of state and federal commitments to transportation investment at the level of the Aspirational Funding Scenario. To summarize, the revenue assumptions underlying the Aspirational Funding Scenario are as follows:

- Near- to mid- term revenues are based on the FY 2018-FY 2027 NJDOT and NJ TRANSIT 10-year capital plans. These plans are based on average annual federal funding level of $1.1 billion

to $1.5 billion, and average annual state funding level of $1.5 billion through FY 2027. Funding for completion of Sandy recovery projects, Portal North Bridge and a new Hudson Tunnel are layered on top of this base.

- Long term (FY 2028-FY 2045) baseline federal and state funds combined increase annually by 3.5 percent. Funding for a new Hudson Tunnel, and the full Gateway Program are layered on top of this base.
- $150 million CIG funding and non-federal match starting in FY 2028, which grow by 3.5 percent per year.

New Jersey Operating Funding Assumptions

While capital funding is critical for the repair and upgrade of the existing transportation network and targeted capacity increases, NJDOT and NJ TRANSIT also require and receive appropriations from the state general fund for ongoing operations.

State general fund appropriations cover NJDOT's direct maintenance and operations expenses, including snow removal, pothole filling, maintenance of roadside lighting, vegetation, inspections, technical studies and general and administrative services. The FY 2018 appropriation is $43.8 million. If adjusted at 2.5 percent annually to keep pace with inflation, the appropriation for NJDOT's annual operating expenses would total $85 million by 2045. Actual appropriations have declined in recent years due to ongoing constraints on the state budget. For example, the NJDOT appropriation for operations in FY 2008 was $88.7 million. Continued reductions in funds to cover operating expenses over time could affect NJDOT's ability to monitor and maintain the roadway and bridge network and lead to higher capital costs, longer-term capital costs, or both.

NJ TRANSIT is the nation's largest public transit system by service area, creating substantial needs for operating funds. NJ TRANSIT pursues a variety of initiatives to maximize system-generated revenue and reduce expenses to allow it to provide cost-effective service while keeping the transit system in a state-of-good-repair.

NJ TRANSIT's FY 2018 operating budget projects an expenditure of about $2.2 billion to provide public transit services on the current system (Table 6-3). The NJTPA region accounts for approximately 80 percent of these costs, or almost $1.8 billion. Approximately 51 percent of NJ TRANSIT's operating budget is supported by passenger fares and other system-generated revenues (such as parking fees and advertising payments). The balance is supported by various state and federal funding sources. State sources include the general fund, capital-to-operating transfer, the New Jersey Turnpike Authority, the State Clean Energy Fund, and others.

It is projected that annual operation costs will more than double and reach over $4.3 billion by 2045. This projection is based on operating funding requirements for existing services and anticipated future funding required to support growth in those services to accommodate future demands. These projections include allowances for inflation, and growth in service to accommodate a moderate rate of growth in ridership demand and limited initiation of new services beyond the current system. The Plan 2045 Scenario does not account for additional operating costs associated with increases in trans-Hudson capacity and rail service that will be enabled by completion of the full Gateway Program under the Aspirational Funding Scenario. In order to fund the projected increase under the Plan 2045 Scenario, NJ TRANSIT will continue to place emphasis on future partnerships and efficiencies to control expenses.

Use of capital funding for operations must also be

Table 6-3:
NJ TRANSIT Operating Budget Projections (millions, year of expenditure dollars)

Expenses	FY 2018 Proposed Budget	FY 2045 Budget Projection*
Proposed Budget	1,346.5	2,318.3
Budget Projection*	317.7	572.9
Services Other Than Personnel	142.9	301.0
Purchased Transportation	243.6	594.3
Insurance & Claims	33.2	301.0
Tolls, Taxes & Other Operating Expenses	133.9	594.3
Total	**2,217.8**	**4,306.3**

*The budget projection provides for growth in labor and services expenses at a rate averaging approximately 3 percent per year over the life of the long range plan. Costs for energy is expected to grow at approximately 2 to 3 percent per year, as are costs for purchased transportation. Other expenses, such as utilities, claims and insurance are expected to grow at approximately 2 to 3 percent. Overall, total expenses are expected to grow at approximately 2.6 percent per year on average.

Sixth Avenue bridge, Hawthorne, Passaic County

addressed. As of FY 2018, a total of $460.8 million in state and federal capital funding is used each year to support NJ TRANSIT operations, principally involving major repair and rehabilitation projects for bus and rail vehicles. Over the long term, this plan calls for the adoption of state policies and funding mechanisms that would allow this practice to be phased out, with the diverted capital funding redirected to other needs.

Expenditures and Investments

The state and federal funding that NJTPA projects to be available under the Plan 2045 Scenario will provide the means to implement the transportation investments identified in this plan to enhance mobility, economic development, quality of life and resiliency. Expenditures under the Limited Scenario will fall short of addressing the region's needs. Under the Aspirational Funding Scenario, the region could invest in an expanded agenda of projects to address critical multi-modal capacity constraints. This section summarizes the investment levels for each scenario.

Decisions about how most funding will be allocated among investments are guided by the RCIS (Chapter 4), with the exception of special large-scale investments such as the Portal North Bridge and Hudson Tunnel that are layered over base funding amounts. In addition, this plan takes into account state investment priorities and strategies, which are well aligned with the RCIS.

For all scenarios, cost-effective use of funds will depend on continuing efforts to streamline project delivery from the planning stage to construction, including reducing unnecessary regulatory delays and exploring new approaches to project implementation, such as design-build and design-build-operate-maintain contracts. In addition, effective use of the latest technologies (including advanced materials) will maximize the benefits achieved. Over the life of the plan, new technologies, if applied effectively, may contribute to increased efficiencies and cost reduction.

Plan 2045 Capital Expenditures

The Plan 2045 Scenario is intended as a realistic approach for guiding future transportation investments. To match revenues, total Plan 2045 expenditures are projected to be YOE $112.8 billion (shown in total in Table 6-4 and on an average annual basis in Table 6-5). While most investments are focused on maintaining the existing transportation network in a state of good repair, the Plan 2045 Scenario includes

Table 6-4:
Plan 2045 Scenario, Total Sources and Uses (millions, year of expenditure dollars)

REVENUES	NEAR TERM (FY 2018-FY 2021)	MID TERM (FY 2022-FY 2027)	LONG TERM (FY 2028-FY 2045)	TOTAL
All Federal	8,427	12,436	35,279	**56,142**
All State	7,159	10,646	37,894	**55,698**
Other*	376	161	413	**950**
TOTAL	**15,962**	**23,243**	**73,585**	**112,790**

EXPENDITURES (RCIS CATEGORIES)	NEAR TERM (FY 2018-FY 2021)	MID TERM (FY 2022-FY 2027)	LONG TERM (FY 2028-FY 2045)	TOTAL
Bridges	1,843	3,803	13,377	**19,024**
Road Preservation	2,165	3,751	15,713	**21,628**
Road Enhancement	443	438	752	**1,632**
Road Expansion	230	197	614	**1,041**
Transit Preservation	4,944	6,402	24,671	**36,017**
Transit Enhancement	372	520	2,057	**2,949**
Transit Expansion	4,132	5,664	6,551	**16,346**
Dedicated Freight	469	617	2,815	**3,900**
Direct ITS	389	568	2,199	**3,155**
TDM	184	298	1,187	**1,668**
Direct Safety	513	652	2,465	**3,630**
Direct Bike/Ped	279	335	1,184	**1,799**
TOTAL	**15,962**	**23,243**	**73,585**	**112,790**

*Other includes Port Authority of New York and New Jersey, New Jersey Turnpike Authority and Metro-North contributions. Overhead expenses are proportionally allocated across Uses.

Table 6-5:
Plan 2045 Average Annual Revenues (millions of year of expenditure dollars)

REVENUES	NEAR TERM (2014-2017)	MID TERM (2018-2023)	LONG TERM (2024-2040)
All Federal	2,107	2,073	1,960
All State	1,790	1,774	2,105
Other*	94	27	23
TOTAL	**3,990**	**3,874**	**4,088**

*Other includes Port Authority of New York and New Jersey, New Jersey Turnpike Authority and Metro-North contributions.

funding to implement selected upgrades and improvements to enhance system capacity, performance and resiliency. It includes the implementation of projects and programs included in the Project Index over the near-, mid- and long-term.

In addition, to replacement of the Portal North Bridge and a new Hudson River tunnel, the Plan 2045 Scenario includes a number of future rail projects in the region that are now undergoing planning and environmental analysis and may be candidates for federal funding. A few initial operating segments, if found to be justified and feasible through detailed study, could

Table 6-6:
Limited Funding Scenario, Total Sources and Uses (millions, year of expenditure dollars)

REVENUES	NEAR TERM (FY 2018-FY 2021)	MID TERM (FY 2022-FY 2027)	LONG TERM (FY 2028-FY 2045)	TOTAL
All Federal	5,716	8,427	29,840	**43,983**
All State	6,103	9,316	33,938	**49,357**
Other*	376	161	393	**930**
TOTAL	**12,195**	**17,905**	**64,170**	**94,270**

EXPENDITURES (RCIS CATEGORIES)	NEAR TERM (FY 2018-FY 2021)	MID TERM (FY 2022-FY 2027)	LONG TERM (FY 2028-FY 2045)	TOTAL
Bridges	1,843	3,803	12,438	**18,085**
Road Preservation	2,165	3,751	14,288	**20,203**
Road Enhancement	443	438	715	**1,596**
Road Expansion	230	197	584	**1,011**
Transit Preservation	4,944	6,402	23,483	**34,828**
Transit Enhancement	372	520	1,958	**2,850**
Transit Expansion	365	326	1,331	**2,022**
Dedicated Freight	469	617	2,679	**3,764**
Direct ITS	389	568	2,093	**3,049**
TDM	184	298	1,129	**1,611**
Direct Safety	513	652	2,346	**3,511**
Direct Bike/Ped	279	335	1,127	**1,742**
TOTAL	**12,195**	**17,905**	**64,170**	**94,270**

*Other includes Port Authority of New York and New Jersey, New Jersey Turnpike Authority and Metro-North contributions. Overhead expenses are proportionally allocated across Uses.

be accomplished under the level of funding assumed for the Plan 2045 Scenario, namely through CIG funding of $100 million per year with matching state funds or other non-federal funds starting in FY 2028 and growing annually with inflation. However, most rail expansion projects cannot proceed until additional rail capacity is created through the Gateway Program.

Additionally, under this scenario, highway pavement and bridges are maintained at a state of good repair, and there is investment in modest capacity enhancements on the highway network as well as increases in system efficiency through technological advances.

Limited Funding Scenario Capital Expenditures

The Limited Funding Scenario assumes long-term revenue growth that falls below the forecasted rate of long-term inflation. Expenditures for FY 2018-2027 reflect the near- and mid-term projects and programs in the FY 2018-2027 TCP. Long term project and program expenditures are assumed to increase by 2 percent annually after FY 2027.

As a result, the Limited Funding Scenario supports total investments equal to YOE $94.3 billion (Table 6-6). This scenario provides sufficient funding to support a maintenance-oriented mix of projects and programs, but also reflects no new bus or fixed guideway transit services, or highway capacity improvements other than those already programmed. As a result, under this scenario, the region will be less prepared to meet the demands on the transportation system of a growing population and economy.

Table 6.4:
Aspirational Funding Scenario, Total Sources and Uses (millions, year of expenditure dollars)

REVENUES	NEAR TERM (FY 2018-FY 2021)	MID TERM (FY 2022-FY 2027)	LONG TERM (FY 2028-FY 2045)	TOTAL
All Federal	8,427	12,436	46,570	**67,434**
All State	7,159	10,646	55,958	**73,762**
Other*	376	161	456	**993**
TOTAL	**15,962**	**23,243**	**102,984**	**142,189**

EXPENDITURES (RCIS CATEGORIES)	NEAR TERM (FY 2018-FY 2021)	MID TERM (FY 2022-FY 2027)	LONG TERM (FY 2028-FY 2045)	TOTAL
Bridges	1,843	3,803	14,782	**20,429**
Road Preservation	2,165	3,751	17,364	**23,279**
Road Enhancement	443	438	830	**1,711**
Road Expansion	230	197	678	**1,105**
Transit Preservation	4,944	6,402	27,264	**38,609**
Transit Enhancement	372	520	2,273	**3,165**
Transit Expansion	4,132	5,664	28,910	38,705
Dedicated Freight	469	617	3,110	4,196
Direct ITS	389	568	2,430	3,386
TDM	184	298	1,311	1,793
Direct Safety	513	652	2,723	3,889
Direct Bike/Ped	279	335	1,308	1,923
TOTAL	**15,962**	**23,243**	**102,984**	**142,189**

*Other includes Port Authority of New York and New Jersey, New Jersey Turnpike Authority and Metro-North contributions. Overhead expenses are proportionally allocated across Uses.

Aspirational Scenario Capital Expenditures

The Aspirational Funding Scenario sets a more aggressive yet feasible goal for the region. It identifies transportation investments that could potentially be made if significant new funding were realized. Capital expenditures total YOE $142.2 billion. This scenario includes all of the investments assumed in the Plan 2045 Scenario, as well as greater expenditures on projects and programs across all categories. Notably, $38.7 billion in transit expansion (Table 6-7) supports the Gateway Program, creating needed trans-Hudson passenger rail capacity, as well as additional new mass transit services that are under study in New Jersey, and in part a new Port Authority Bus Terminal (PABT). Transit expansion is funded by various federal funding sources as well as with CIG and matching state funds or other non-federal funds. Under this scenario, the region is better prepared to meet the transportation demands of the future.

Other Funding for Transportation

The state and federal investments discussed in this chapter are supplemented by additional investments by other transportation agencies—principally, the Port Authority of New York & New Jersey, New Jersey Turnpike Authority and Delaware River Joint Toll Bridge Commission. Their investments will continue over the life of this plan. Key projects planned by the authorities are included in the Project Index. The jurisdiction of these authorities is as follows:

Port Authority of NY & NJ

Key facilities operated by the Port Authority within the NJTPA region include Newark Liberty International Airport, Teterboro Airport, the PATH rail system, the port complex in Newark and Elizabeth and major New York-New Jersey crossings—the Outerbridge Crossing, Goethals Bridge, Bayonne Bridge, Holland Tunnel, Lincoln Tunnel and George Washington Bridge. The agency has built passenger ferry facilities, maintains roadways within its facilities, provides on dock and cross-harbor rail freight service, and contributes to other key infrastructure elements that access its facilities and aid the movement of goods and people throughout the region. Port Authority facilities and financial resources are not included within the definition of the federally supported surface transportation system used to establish the fiscally constrained Regional Transportation Plan.

The Port Authority's 2017-2026 $32.2 billion capital plan features investments spread over a broad portfolio of assets and facilities with the goal of keeping them efficient, safe, secure and reliable. In addition to investing in its own assets, the Port Authority's capital plan allocates up to $2.7 billion in debt service support for the Gateway Program. Major projects include essential state-of-good-repair investments at the George Washington Bridge, the Lincoln Tunnel Helix Replacement Program, Port Wharf and Berth Replacement Program, the PABT Interim Improvement Program and further development of the PABT Replacement Program, PATH Rail Extension to Newark Liberty Rail Link Station and PATH Car Fleet Expansion and Sandy recovery and resiliency investments. The Port Authority's 10-year plan notes that the agency may seek to leverage its capital investments to secure additional discretionary federal funding and financing assistance and public-private partnership financing for major projects that enhance the region's surface transportation capacity.

New Jersey Turnpike Authority

The Turnpike Authority operates and maintains both the New Jersey Turnpike and the Garden State Parkway. The Turnpike is 146 miles long (56 miles in the NJTPA region) and includes 27 interchanges, nearly 500 bridges and 12 service areas. The Garden State Parkway is 173 miles long (121 miles within the NJTPA region) and includes 90 interchanges, approximately 300 entrance and exit ramps and nearly 500 bridges. The Turnpike Authority's funding comes from toll revenues, which it uses to meet operations and maintenance expenses, finance capital needs, and to contribute to the TTF. The Turnpike Authority's $7 billion 2009-2018 capital improvement program focused on widening the Turnpike between Interchanges 6 and 9, which was completed in 2014. On-going investments include bridge, road, facility and interchange improvements. The authority raised tolls in 2008 and 2012 to finance its 10 year capital program. In addition, it provides approximately $22 million per year to the TTF, plus additional funds for feeder road maintenance (approximately $4.5 million in CY 2018, approximately $3.5 million in CY 2019, and approximately $2.5 million annually starting in CY 2020) and an additional funds per prior and existing state transportation funding agreements (approximately $166.5 million in CY 2018, approximately $129 million in CY 2019 and 2020, and approximately $64.5 million in 2021).

Amtrak

Amtrak owns the Northeast Corridor and provides intercity passenger rail service that includes regional and high-speed Acela trains connecting North Jersey with Philadelphia, Wilmington, Baltimore

North Branch, Somerset County

and Washington, D.C. to the south; New York City, Providence and Boston to the north and other metropolitan areas throughout the nation. Amtrak, in concert with NJ TRANSIT, is progressing the planning and development of the Gateway Program. This includes a new Portal Bridge, an additional Hudson River rail tunnel, an expansion of Penn Station New York, new rail storage capacity in New Jersey, the Bergen Loop at Secaucus and other improvements. The Moynihan Station Project is not part of the Gateway Program and is advancing separately.

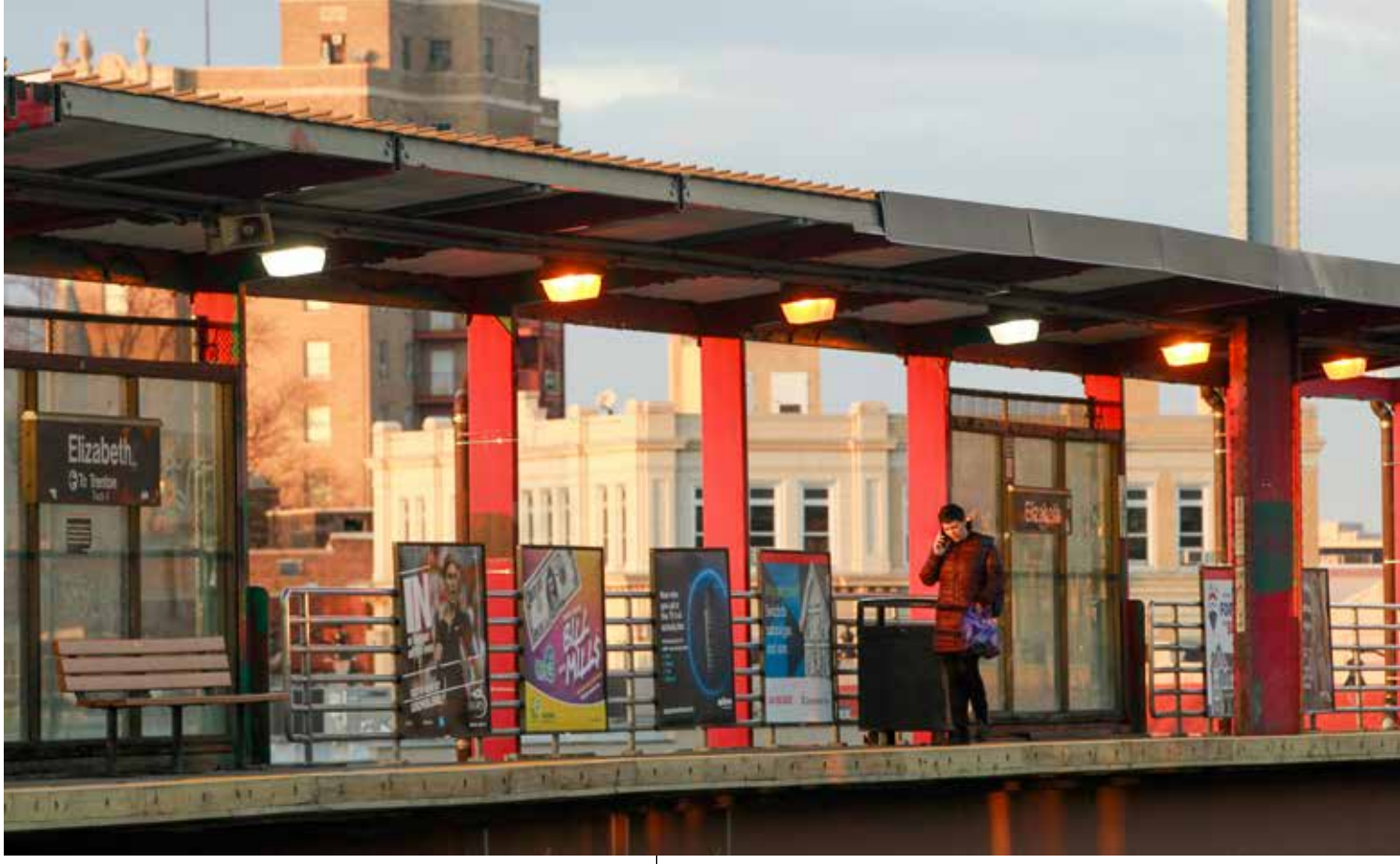
Delaware River Joint Toll Bridge Commission

This commission maintains and operates seven toll bridges and 13 non-tolled bridges over the Delaware River spread out along 139 miles between Bucks County, Pennsylvania and the New York State line. All DRJTBC toll bridges are in the NJTPA region except for the Trenton-Morrisville Bridge. The commission is also responsible for the repair and maintenance of the first seven miles of I-78 in Warren County. The commission relies on its toll revenues to fund operations, maintenance and capital needs. Capital projects are focused on bridge repair, replacement and rehabilitation.

Potential Revenue Sources

As discussed above, existing dedicated state revenue sources for transportation will not keep pace with the cost of increasing transportation needs, even though increased efficiencies in project delivery may be attained through greater use of public/private partnerships and other techniques. Over time, either an increase in the gas tax, the identification of new revenue sources, or both will be needed. A number of potential revenue sources are listed below as a menu of options, absent consideration of political feasibility. Hypothetical unit amounts are presented along with annual revenue to the NJTPA region, assuming that 70 percent of statewide revenue is allocated to the region as is historically the case.

- ***Gas Tax***—Every one cent increase in the New Jersey gas tax generates an additional $38 million in revenue annually.
- ***Motor Vehicle Fees***—Motor vehicle fees include registration fees, fees related to transfer of ownership, registration documentation reproduction, and registration transfers due to changes in weight classes. Discounted fees are available for those eligible for SSI, the lifeline program and the Pharmaceutical Assistance to the Aged and Disabled program (aged 65 or older or with a disability). A five percent increase on motor vehicle fees yields $23 million annually.
- ***Highway Express Lanes with Tolls***—Creation of new express lanes on existing highways, or adding tolls to existing express lanes, may generate new revenue depending upon how it is instituted. Express lanes with tolls are adjacent to and easily accessible from free general purpose highway lanes. Willing users pay a toll to avoid traffic congestion. Tolls can be collected with a cashless electronic system. Dynamic pricing can be easily added to mitigate traffic congestion and increase revenues. Electronic tolling infrastructure can also support incident management. Potential revenue generation varies greatly due to a number of factors. One national study of highway express lanes with tolls found that annual net revenue generation was as high as $1.9 million per mile. A small minority of jurisdictions operated at a net operating loss of up to $50,000 per mile.
- ***Vehicle Miles Traveled (VMT) Tax***—A VMT tax would be a charge on vehicles registered in New Jersey based on the number of miles driven. A one-tenth of a cent tax per mile traveled yields an estimated $52 million per year, excluding heavy trucks and tractor trailers due to data limitations. Inclusion of tractor trailers would result in a higher revenue yield.
- ***Carbon Tax***—A carbon tax is a levy based on the amount of carbon dioxide produced by the vehicle. There are numerous ways of assessing a carbon tax. One way is to apply a VMT tax that has a rate adjustment based on the vehicle's fuel efficiency. Revenue yield may be similar to the VMT tax, with lesser allocation of tax burden to more fuel efficient vehicles.
- ***NJ Transit Fares***—A NJ TRANSIT fare increase would generate additional revenue and most likely result in a ridership decrease.
- ***Advertising / Sponsorship Fees***—NJ TRANSIT generated $17 million in FY 2016 through advertising sales on NJ TRANSIT facilities. There may be



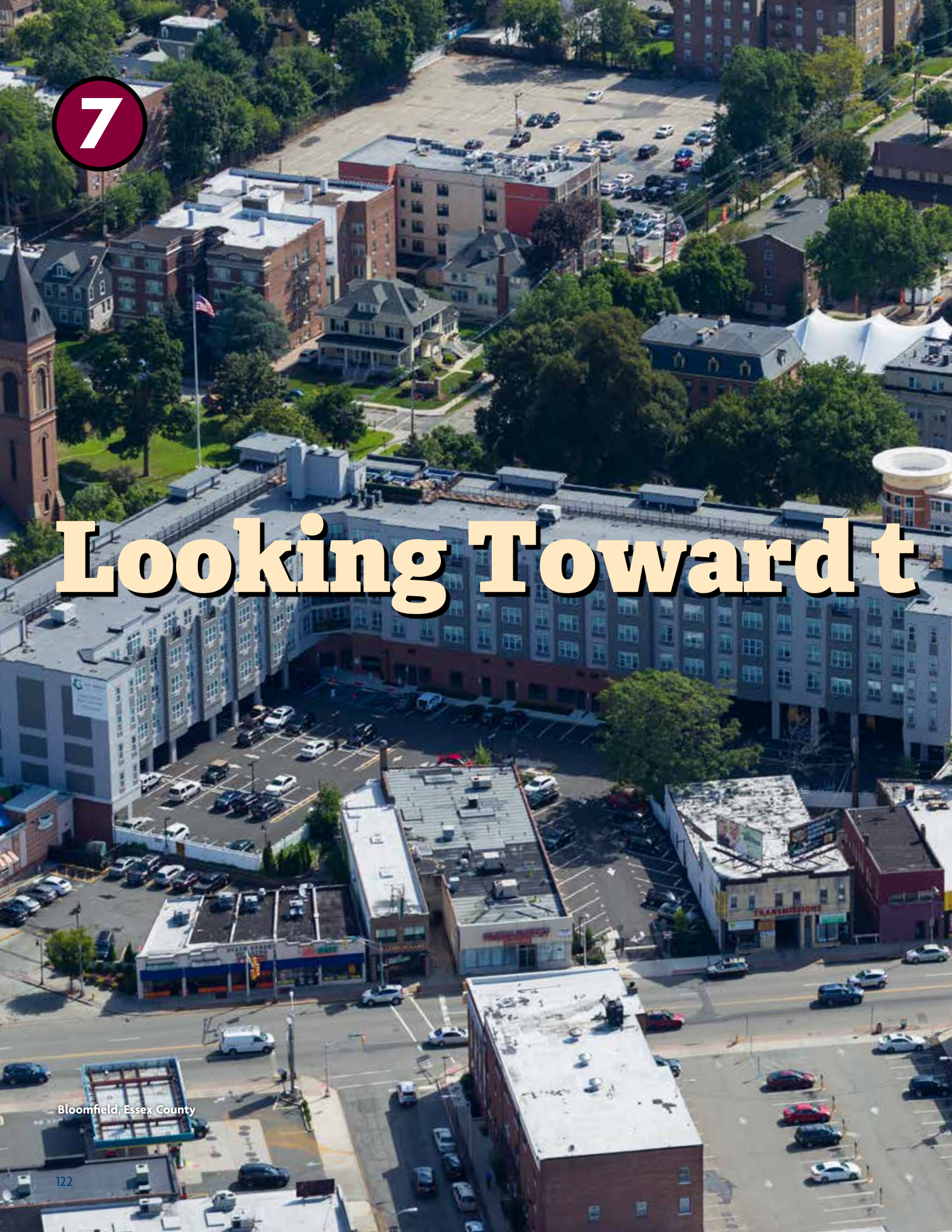
Elizabeth, Union County

potential to generate additional revenues through expansion of advertising on NJ TRANSIT facilities.

- ***Value Capture***—Value capture is a means to capture some of the increased value of new development directly related to adjacent or nearby publicly funded transportation infrastructure investments. Value capture reallocates or creates revenue that can be used to fund transportation investment. There are numerous mechanisms for value capture, including special assessments, developer impact fees, and creation of a Revenue Allocation District (RAD) that sets aside a portion of the normal property tax revenue that is collected on the marginal increase in value of the land or property that is attributable to proximity to the transit investment. Using the average effective municipal tax rate for the NJTPA region of 2.49 percent, $249,000 is generated annually for every ten million dollars' worth of increased property value within a RAD.
- ***Tax on Demand-Based Transportation Services***—Demand-based transportation refers to the flexible free market delivery of transportation services that are coordinated by technology and can dynamically adapt to demand. Such transportation services can be provided by a collection of independent drivers using personal vehicles (e.g. Uber, Lyft) or a single corporation providing shuttle bus services (e.g. Bridj) that dynamically and efficiently determine routes based on passengers' pickup and drop-off locations. Based on an estimate of current Uber charges in New Jersey (which is the current dominant service), a 10 percent tax would yield $15 million per year. Should demand-based transportation services continue to grow, so would revenues.
- ***Tax on E-commerce or Package Delivery***—A tax on e-commerce would be an additional sales tax on the value of purchases made via the internet. A package delivery tax would be levied based on the delivery of packages to homes and offices regardless of the value of the purchase. A one percent sales tax on e-commerce purchases yields $97 million per year. Revenues from a package delivery tax were not calculated. Should e-commerce and package delivery grow over time, so would revenues.
- ***Business Tax***—A one percent surcharge on taxes already collected from New Jersey corporations and unincorporated businesses will yield $30 million per year.

7

Looking Toward t



Bloomfield, Essex County

The Future

Plan 2045 presents a long term vision and framework to help the NJTPA Board of Trustees make decisions year-to-year on where and how investments can be made to meet regional goals. As detailed in Chapter 3 and addressed throughout these pages, the region will see travel demands steadily increase—driven by population growth of 17 percent and employment growth of 14 percent by 2045—placing increased stress on all aspects of the transportation network. All the while, the region will face a host of uncertainties that could greatly impact transportation—new technologies, changes in climate and sea levels, new locational preferences by businesses and families and more.

Based on extensive public and stakeholder outreach (Chapter 2) and technical analysis, Plan 2045 offers a set of principles and guidelines for future investments (Chapter 4) and specific strategies and policies to meet the needs of key facilities and address major issues (Chapter 5). The plan's financial element (Chapter 6) offers a realistic approach to pay for needed improvements, with consideration of alternative funding scenarios.

Implementing this plan will require close cooperation with partner agencies—including NJTPA subregions, NJDOT, NJ TRANSIT, the Port Authority and the TMAs—and with numerous interests and groups in the state, and could include partnerships with commercial or philanthropic organizations for local initiatives. Of particular importance, the NJTPA will continue its leadership and participation in the Together North Jersey consortium as it works to make

Sparta, Sussex County

the region more **competitive**, **efficient**, **livable** and **resilient**. As highlighted throughout this plan, the NJTPA will seek to use its investments and planning programs to support these broad themes and the strategies and actions recommended in the Together North Jersey plan. Continued involvement with Together North Jersey will ensure that NJTPA's transportation planning supports strengthening communities and bringing economic progress to all segments of the region.

In addition to Together North Jersey, other plans and planning documents, referenced previously, will help shape how the NJTPA implements Plan 2045. Among them:

Regional Comprehensive Economic Development Strategy (CEDS)—Developed in cooperation with Together North Jersey partners, the CEDS seeks to increase access to opportunities and prosperity by advancing regional priorities through local actions.

Regional Coordinated Human Services Transportation Plan—This plan identifies transportation priorities for meeting the needs of the special mobility challenges facing seniors, low-income people, veterans and people with disabilities.

New Jersey Statewide Freight Plan—This federally required document was developed by public agencies in the state, with input from the private sector and other interests. Finalized in fall 2017, it addresses the full range of freight issues facing the state and region.

Strategic Highway Safety Plan (SHSP)—Completed in 2005, the state's plan identifies several priority emphasis areas for improving safety: lane departures, aggressive driving, drowsy and distracted driving, intersections, mature drivers, and pedestrians and bicycles.

The Connected Corridor—Completed in 2014, it includes technology standards and protocols—called the state ITS architecture—and addresses strategies for improved management of transportation systems and their operation.

State Development and Redevelopment Plan—This plan designates planning areas that share common development and environmental conditions as areas for growth, limited growth, or conservation.

Highlands Regional Master Plan—This plan guides implementation of the Highlands Water Protection and Planning Act of 2004.

In addition to attending to needs on the existing transportation network, the NJTPA and partner agencies must continue to preserve and study possible multimodal transportation use of abandoned rights-of-way. One example is the Bergen Arches in Jersey City, which was once a rail corridor but was abandoned decades ago. Another, as discussed in chapter 5, is the route of the Morris Canal now undergoing study to complete a continuous greenway through six counties.

Beyond these planning efforts, the NJTPA must continue to assist counties and municipalities in pursuing the goals and policies articulated in Plan 2045 and help adapt them to local conditions and needs.

To this end, as noted, NJTPA's involvement with Together North Jersey includes many locally-focused efforts. In addition, the NJTPA's subregional programs—such as grants for studies of local needs, data collection, master plan updates, the exploration of project concepts and other activities—are helping address priority local issues. A particularly important locally focused effort will be continuing to expand the Street Smart NJ pedestrian safety campaign (see Street Smart NJ p. 95) to more communities, with the help of TMAs.

NJTPA also must continue to apply its staff resources, expertise and technical tools to better address regional mobility needs. This includes coordinating studies of key corridors, performing computer modeling and GIS mapping, serving as a repository for transportation data, assisting in engineering and environmental reviews for project delivery, working with communities to pilot innovative planning approaches, and managing and administering the TIP, among other responsibilities.

A performance-based approach will continue to underpin much of this work, emphasizing ways in which progress toward NJTPA goals can be measured and how potential actions and investments can be systematically evaluated. This includes the NJTPA's ongoing Congestion Management Process, prioritizing projects with defined performance criteria, and new federally required monitoring and regional target setting.

All these activities will be undertaken at the direction of the NJTPA Board of Trustees and its standing committees. The Board will draw upon this plan in preparing an update of the agency's Strategic Business Plan, with the goal of improving the organization to better meet the many challenges and opportunities Plan 2045 identifies and to better serve citizens of the region. As discussed in Chapter 4, the Board will receive important feedback on the impacts of its decisions through implementation of federally mandated performance measures whose targets will be set and monitored by NJTPA and its state planning partners.

While these and other efforts to implement Plan 2045 appropriately focus on issues and needs within the region, the plan's vision extends beyond North Jersey. The region's economy is closely tied to the larger New York and Connecticut metropolitan area and to the mega-region extending throughout the northeastern United States. Coordination and cooperation among the NJTPA and neighboring MPOs on cross-border issues and on sharing best practices will continue to be accomplished through the Metropolitan Area Planning (MAP) Forum, which meets periodically and has ongoing staff communications.

The most pressing metropolitan-wide need—identified as the highest investment priority in this plan (see Trans-Hudson Travel p. 58)—is to complete a new Hudson River rail tunnel and to accomplish the

Highlands, Monmouth County

larger Gateway Program. It will provide new travel capacity and accommodate new rail services feeding into the Northeast Corridor. The NJTPA has joined with MPOs in the larger metropolitan region, as well as with state and local agencies to document the vital need for these improvements to support the economic wellbeing of upwards of 30 million people in the region and beyond. Non-profit, academic, research and advocacy organizations—including the Regional Plan Association—have contributed their visions and plans for future development, which complement and present alternatives for many of the strategies offered in Plan 2045. All recognize the essential need for new trans-Hudson rail capacity. Advancing the tunnel and Gateway Program will be a sustained focus of efforts to implement Plan 2045.

Attending to such metropolitan level needs while also effectively supporting regional and local level priorities, as noted above, follows the mandate for comprehensive planning under federal law required of the NJTPA and MPOs across the country. In addition to being comprehensive, MPO planning must be continuing and cooperative—rounding out the so-called "3C process" required by law. For NJTPA, the cooperative aspect is evidenced by the growing number of partners it has engaged in the planning process. NJTPA's leadership and participation in Together North Jersey, which helped shape this plan represents a substantial broadening of cooperation, extending NJTPA support and involvement to many groups and issues outside of traditional MPO planning. It is an exciting direction that has already yielded new approaches and innovations in serving the needs of the region.

The third "C," continuing planning, is embodied in this plan itself. The strategies, policies and projects contained in Plan 2045 represent commitments by the NJTPA and its partners to undertake the steps needed to improve mobility in particular locations, in specific ways and with a focus on achieving particular goals and objectives—an ongoing process that will continue over the life of this plan. Indeed, with adoption of this plan, efforts commence to monitor and assess progress in meeting these commitments, to take stock of new challenges and conditions as they unfold and to take mid-course corrections when needed—all in preparation for the next long range plan update in 2021. Plan 2045 provides the foundation for comprehensive, cooperative and continuous planning to ensure citizens and businesses will be well prepared for future uncertainties and be able to fully realize the benefits of improved transportation in supporting economic progress, safeguarding the environment and strengthening communities.

Supporting Documents

The following Project Index contains current and future candidate projects that have been identified through the metropolitan planning process in northern New Jersey and whose costs can be accommodated based on the 28-year funding assumptions as set forth in Chapter 5. The Index arrays projects by the county in which they are located. They are further arrayed by Highway/Bridges, Transit and Authority categories as well as by timeframe. Near-term projects are those that can be completed within one to four years. This includes projects contained in the 4-year NJTPA Transportation Improvement Program (TIP). Mid-term projects are scheduled to be completed in years 5 through 10. They include the six out-years of the 10-year State Transportation Improvement Program (STIP). Long-term projects are estimated to be completed during the final 15 years of the Plan, years 13 to 28. Projects in the Study and Development Program are included in the "Projects under Study" category of the Index. Projects are listed in their respective timeframe category based on the year they will be completed (near, mid, or long-term). All costs are presented in Year of Expenditure (YOE) dollars.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)

Bergen

Highway/Bridges

Near-Term

ADA North, Contract 5	15415	Bike/Ped	1.10
ADA North, Contract 6	15416	Bike/Ped	2.53
** Fifth Avenue Bridge (AKA Fair Lawn Avenue Bridge) over Passaic River	NS9606	Bridges	17.50
Route 4, Jones Road Bridge	94064	Bridges	28.30
Route 4, River Drive to Tunbridge Road	12431A	Road Preservation	7.35
Route 4, Tunbridge Road to Route 9W	12431B	Road Preservation	24.08
Route 46, Bergen Boulevard to Main Street	12428	Road Preservation	6.67

Mid-Term

Market Street/Essex Street/Rochelle Avenue	98546	Road Enhancement	10.20
Route 1&9, Bridge over NYS&W RR & Division Street to Fairview Avenue	9240	Bridges	45.92
Route 4, Bridge over Palisade Avenue, Windsor Road and CSX Railroad	065C	Bridges	59.50
Route 4, Grand Avenue Bridge	08410	Bridges	31.88
Route 4, Hackensack River Bridge	02346	Bridges	83.80
Route 4, Teaneck Road Bridge	93134	Bridges	14.60
Route 9W, Palisades Avenue to New York State Line	11406	Bike/Ped	25.95
Route 17, Bridges over NYS&W RR & RR Spur & Central Avenue (CR 44)	14319	Bridges	33.35
Route 17, Sprout Brook, Culvert Replacement	11357	Bridges	5.28
Route 46, Bridge over Erie-Lackawanna Railroad	16348	Bridges	15.70
Route 46, Bridges over Route 17	14418	Bridges	45.45
Route 80 WB, McBride Avenue (CR 639) to Polify Road (CR 55)	11415	Road Enhancement	339.80
Route 208, Wyckoff Twp., Bergen Co., Culvert Replacement	11355	Bridges	3.32
Route 3 EB, Bridge over Hackensack River & Meadowlands Parkway	15430	Bridges	89.50

Projects Under Study

East Anderson Street Bridge (02C0023A) over the Hackensack River	N1801	Bridges
Kingsland Avenue, Bridge over Passaic River	N1601	Bridges
Route 9W, Bridge over Route 95, 1& 9, 46, and 4	14424	Bridges
Route 17, Central Avenue Bridge, Rochelle Park	94056	Bridges
Route 17, Essex Street to South of Route 4	103A1	Road Expansion
Route 17, NYS&W Bridge	94057	Bridges
Route 17, Pierrepont Ave to Terrace Ave/Polify Rd (CR 55)	15383	Road Preservation
Route 17, Williams Avenue to I-80	103A2	Road Expansion

** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Route 63, Bridge over Fairview Avenue	16343	Bridges	
Route 208, Bergen County Drainage Improvements	11381	Road Preservation	
Route 287, Truck Weigh Station, Bergen County	858	Road Preservation	

NJ TRANSIT

Near-Term

Lyndhurst Intermodal ADA Improvements	T610	Transit Enhancement	5.88

Authority Projects

Near/Mid-Term

New Jersey Sports & Exposition Authority

Carlstadt Bicycle Improvements (B1)	MC09038_B	Bike/Ped	
Carlstadt/Moonachie Shuttle (NJSEA MTPD Project T6)	MC09054_T	TDM	
East Rutherford Bicycle Improvements (B2)	MC09039_B	Bike/Ped	
Meadows Path Bicycle Improvements (B12)	MC09050_B	Bike/Ped	
Meadows Path Bicycle Improvements (B5)	MC09047_B	Bike/Ped	
Meadows Path Bicycle Improvements (B6)	MC09048_B	Bike/Ped	
Meadows Path Bicycle Improvements (B8)	MC09049_B	Bike/Ped	
Moonachie Avenue and Grand Street, Moonachie (NJSEA MDTP Project E2)	MC09020_R	Road Enhancement	
Moonachie Avenue Pedestrian Improvements, Moonachie (NJSEA MTPD Project P6)	MC09037_P	Safety	
Moonachie Bicycle Improvements (B7)	MC09041_B	Bike/Ped	
Murray Hill Parkway and East Union Avenue, East Rutherford (NJSEA MDTP Project E4)	MC09021_R	Road Enhancement	
Murray Hill Parkway and East Union Avenue, East Rutherford (NJSEA MDTP Project I4)	MC09006_R	Road Enhancement	
Paterson Plank Road Pedestrian Improvements, East Rutherford/Carlstadt (NJSEA MTPD Project P4)	MC09035_P	Bike/Ped	
Rutherford Bicycle Improvements (B10)	MC09042_B	Bike/Ped	
Teterboro Bicycle Improvements (B13)	MC09043_B	Bike/Ped	
Valley Brook Avenue Pedestrian Improvements, Lyndhurst (NJSEA MTPD Project P1)	MC09032_P	Bike/Ped	

New Jersey Turnpike Authority

GSP Interchange 163	GSP1407	Road Enhancement	

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)

Essex

Highway/Bridges

Near-Term

ADA North, Contract 4	15414	Bike/Ped	5.10
** Delancy Street, Avenue I to Avenue P	NS0504	Road Enhancement	15.00
* Main Street and Scotland Road, Intersection Improvements	N1706	Road Enhancement	0.50
** McClellan Street Underpass	NS9812	Road Enhancement	15.00
Replacement of Bridge 3.08 on ConRail Passaic & Harsimus (P&H) Line	N1709	Freight	2.00
Route 7, Mill Street (CR 672) to Park Avenue (CR 646)	12408B	Road Preservation	11.90
Route 23, Bloomfield Avenue to Bridge over NJ TRANSIT, ADA Contract	12420A	Road Preservation	3.45
Route 27, Dehart Place to Route 21	15371	Road Preservation	13.26
Route 46, Passaic Avenue to Willowbrook Mall	9233B3	Road Enhancement	37.20
Route 46, Route 287 to Route 23 (Pompton Avenue), ITS	06366B	ITS	5.90
Route 280 Rockfall Mitigation, West Orange Township	16327	Safety	3.30
Route 280, WB Ramp over 1st & Orange Streets, Newark Subway & NJ TRANSIT	12318	Bridges	26.75
** Two Bridges Road Bridge and West Belt Extension	NS9801	Bridges	23.20

Mid-Term

PANY&NJ-NJDOT Project Program	11407	Bridges	325.00
Port Newark Container Terminal (PNCT) Access Improvement and Expansion Project	N1501	Freight	206.19
Route 10, Chelsea Drive to Kelly Drive	15439	Bike/Ped	7.25
Route 21, Newark Needs Analysis, Murray Street to Edison Place	99381	Road Enhancement	35.90
Route 23, Route 80 and Route 46 Interchange	9233B6	Road Enhancement	32.00

Projects Under Study

Clay Street Bridge over the Passaic River	N1402	Bridges	
CR 508 (Bridge Street), Bridge over Passaic River	N1602	Bridges	
CR 508 (Central Avenue), Bridge over City Subway	N1605	Bridges	
EWR Southern Access Roadway	94047A	Road Enhancement	
Route 21, Lafayette Street to On Ramp at Interchange 7	15377	Road Preservation	
Route 21, Newark Riverfront Pedestrian and Bicycle Access	98540	Bike/Ped	

* Denotes projects with Congressionally designated funding which does not necessarily reflect the full cost of projects, nor the YOE amount.

** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Authority Projects			
Near-Term			
Port Authority of NY & NJ			
Equipment Purchases	PA1421	Transit Preservation	11.50
Salt Mitigation	PA1412	Transit Preservation	99.44
Substations	PA1413	Transit Preservation	33.89
Trackwork Repair and Restoration	PA1419	Transit Preservation	87.10
Near/Mid-Term			
New Jersey Turnpike Authority			
Deck Reconstruction of the Newark Bay—Hudson County Bridge	TPK1406	Bridges	
GSP Interchange 145	GSP1406	Road Enhancement	
Under Study			
Port Authority of NY & NJ			
PATH Extension to NEC Rail Link Station	CP10-004	Transit Expansion	
Hudson			
Highway/Bridges			
Near-Term			
ADA North, Contract 6	15416	Bike/Ped	2.53
* Conrail Passaic & Harsimus Line, Hack to Kearny Double Track (Liberty Corridor)	17340	Freight	1.80
* Johnston Avenue Road Improvements	N1704	Bike/Ped	1.37
Pedestrian Bridge over Route 440	17356	Bike/Ped	4.87
Portway, Fish House Road/Pennsylvania Avenue, CR 659	97005B	Freight	26.30
Route 1, Route 3 to 46th Street	15376	Road Preservation	2.69
Route 3, Bridge over Northern Secondary & Ramp A	08346	Bridges	22.50
Mid-Term			
PANY&NJ-NJDOT Project Program	11407	Bridges	325.00
Paterson Plank Road (CR 681), Bridge over Route 3 at MP 10.04	16307	Bridges	6.45
Route 1&9, Bridge over NYS&W RR & Division Street to Fairview Avenue	9240	Bridges	45.92
Route 3 & Route 495 Interchange	12386	Bridges	61.10
Route 7, Kearny, Drainage Improvements	93186	Road Preservation	81.40
Route 3 EB, Bridge over Hackensack River & Meadowlands Parkway	15430	Bridges	89.50

* Denotes projects with Congressionally designated funding which does not necessarily reflect the full cost of projects, nor the YOE amount.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Projects Under Study			
Clay Street Bridge over the Passaic River	N1402	Bridges	
CR 508 (Bridge Street), Bridge over Passaic River	N1602	Bridges	
JFK Boulevard East, River Road, Manhattan Avenue, and Paterson Plank Road	N1603	Road Enhancement	
Koppers Coke Access Road (Liberty Corridor)	N1702	Freight	
Meadowlands Parkway Bridge	N1802	Bridges	
Route 1&9T, Secaucus Road to Little Ferry	97005E	Freight	
Route 440/1&9, Boulevard through Jersey City	06307	Road Enhancement	
NJ TRANSIT			
Projects Under Study			
Hoboken Terminal Accessibility & Resilience Improvements	TLM03	Transit Preservation	
Trans-Hudson Planning & Coordination	TN16001	Transit Expansion	
Authority Projects			
Near-Term			
Port Authority of NY & NJ			
Concrete Sea Wall East of Harrison Car Maintenance Facility	PA1424	Transit Preservation	9.78
Equipment Purchases	PA1421	Transit Preservation	11.50
Harrison Car Maintenance Facility Automatic Flood Barrier	PA1423	Transit Preservation	7.38
Lifts	PA1416	Transit Preservation	6.67
Priority Protective Measures with Potential Environmental Impacts	PA1411	Transit Preservation	3.40
Rehabilitation of PATH Stations	PA1711	Transit Preservation	5.00
Repairs at Harrison Car Maintenance Facility	PA1710	Transit Preservation	22.59
Salt Mitigation	PA1412	Transit Preservation	99.44
Substations	PA1413	Transit Preservation	33.89
Trackwork Repair and Restoration	PA1419	Transit Preservation	87.10
Vertical Transportation	PA1415	Transit Preservation	11.00
Near/Mid-Term			
New Jersey Sports & Exposition Authority			
83rd Street, between US 1&9 and Westside Avenue, North Bergen (NJSEA MDTP Project L15)	MC14001_R	Road Enhancement	
County Avenue and Secaucus Road, Secaucus (NJSEA MDTP Project I6)	MC09008_R	Road Enhancement	
Harrison Avenue Area Pedestrian Improvements, Kearny (NJSEA MTPD Project P2)	MC09033_P	Bike/Ped	
Meadowland Parkway, between NJ Route 3 and Broadcast Plaza, Secaucus (NJSEA MDTP Project L10)	MC09002_R	Road Enhancement	
Meadowlands Parkway and NJ Route 3 westbound ramp, Secaucus (NJSEA MDTP Project E9)	MC09025_R	Road Enhancement	
Meadows Path Bicycle Improvements (B4)	MC09046_B	Bike/Ped	
New County Road and County Road Extension Pedestrian Improvements, Secaucus (NJSEA MTPD Project P5)	MC09036_P	Bike/Ped	

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
NJ Route 3 eastbound service road & Plaza Drive, Secaucus (NJSEA MDTP Project E7)	MC09023_R	Road Enhancement	
Paterson Plank Road and 1st Street, Secaucus (NJSEA MDTP Project I12)	MC09013_R	Road Enhancement	
Paterson Plank Road and Harmon Meadow Boulevard, Secaucus (NJSEA MDTP Project I5)	MC09007_R	Road Enhancement	
Paterson Plank Road and Terminal Road, Secaucus (NJSEA MDTP Project E5)	MC09022_R	Road Enhancement	
Secaucus Greenway Bicycle Improvements (NJSEA MTPD Project B11)	MC09045_B	Bike/Ped	
Secaucus Greenway Bicycle Improvements (NJSEA MTPD Project B3)	MC09040_B	Safety	
Secaucus Greenway Bicycle Improvements (NJSEA MTPD Project B9)	MC09044_B	Bike/Ped	
Secaucus Transit Village Shuttle (NJSEA MTPD Project T3)	MC09052_T	TDM	
Secaucus-North Bergen Shuttle (NJSEA MTPD Project T5)	MC09030_T	TDM	
South Secaucus Shuttle Area (NJSEA MTPD Project T4)	MC09055_T	TDM	
Westside Avenue and Paterson Plank Road, North Bergen (NJSEA MDTP Project I3)	MC09005_R	Road Enhancement	
Westside Avenue Pedestrian Improvements, North Bergen (NJSEA MTPD Project P3)	MC09034_P	Bike/Ped	
New Jersey Turnpike Authority			
Deck Reconstruction of the Newark Bay—Hudson County Bridge	TPK1406	Bridges	
NJ Turnpike Interchange 14A Improvement Project	TPK1405	Road Expansion	
NJ Turnpike Interchange Newark Bay-Hudson County Extension Study	TPK1407	Road Expansion	
Port Authority of NY & NJ			
Bayonne Bridge Elevation	CB06-087	Bridges	
NEAT Conversion to Container Terminal (CP10-002)	CP10-002	Freight	

Hunterdon

Highway/Bridges

Near-Term

ADA Central, Contract 3	15419	Bike/Ped	10.48
Church Street Bridge, CR 579	NS9806	Bridges	4.20
Delaware & Raritan Canal Bridges	15322	Bridges	12.25
** Milford-Warren Glen Road, CR 519	NS9703	Road Enhancement	8.30
Route 22, EB, Route 78 to Rt 28 (CR 614, Easton Turnpike)	11409	Road Preservation	10.69
Route 29, Bridge over Copper Creek	16351	Bridges	4.30
Route 29, Rockfall Mitigation, Kingwood Twp	11413B	Safety	29.00
Route 31 SB, CR 523 (Walter Foran Boulevard) to Wescott Drive (CR 600)	08327B	Road Enhancement	5.20
Route 31, Bull Run Road to Branch of Stoney Brook	12401	Road Preservation	1.88
Route 78 Rockfall Mitigation, Bethlehem Township	15338	Safety	8.00

** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Mid-Term			
Route 22, Bridge over NJT Raritan Valley Line	14425	Bridges	10.95
Route 29, Alexauken Creek Road to Washington Street	11413C	Road Preservation	12.40
Route 31, Church Street (CR 650) to E Main Street/ Flemington Jct Road	08327C	Road Enhancement	13.28
Route 31, HealthQuest Boulevard to River Road	08327D	Road Enhancement	9.80
Route 31, Route 78/22 to Graysrock Road	11342A	Road Preservation	10.03
Projects Under Study			
Route 29, Rockfall Mitigation, West Amwell & Lambertville	15443	Safety	
Route 31, Integrated Land Use & Transportation Plan	403A	Road Expansion	
Route 78, Bridge over Beaver Brook	16341	Bridges	
Route 78, Edna Mahan Frontage Road	9137A	Road Enhancement	
Route 78, Interchange Study at Route 31	93141	Road Enhancement	
Route 173, Bridge over Mulhockaway Creek	16338	Bridges	
Route 173, CR 513 (Pittstown Rd) to Beaver Avenue (CR 626)	16362	Bike/Ped	

Authority Projects

Near/Mid-Term

Delaware River Joint Toll Bridge Commission

CB-S TSB Approach Pavement & Stormwater Inlet Improvements	DB14026	Road Preservation
Centre Bridge Stockton Toll Supported Bridge Rehabilitation	DB14027	Bridges
Lumberville-Raven Rock Pedestrian Bridge Rehabilitation	DB14003	Bridges
Milford-Montague Toll	DB14016 ITS	
New Hope–Lambertville Toll Bridge Floor System Rehabilitation	DB14020	Bridges
New Hope–Lambertville Toll	DB14011 ITS	
New Hope–Lambertville Toll Bridge Approach Roadways & Bridges Improvements	DB14001	Bridges
NH-L Toll Supported Bridge Rehabilitation	DB14025	Bridges
NHS TSB Floor System Replacement & Rehabilitation	DB14029	Bridges
R-B TSB Rehabilitation	DB14030	Bridges
Uhlerstown–Frenchtown TSB Rehabilitation	DB14028	Bridges

Middlesex

Highway/Bridges

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Near-Term			
ADA Central, Contract 2	15418	Bike/Ped	14.20
ADA Central, Contract 3	15419	Bike/Ped	10.48
Delaware & Raritan Canal Bridges	15322	Bridges	12.25
* Livingston Avenue Traffic Calming	N1705	Safety	6.01
** Oak Tree Road Bridge, CR 604	99316	Bridges	14.75
Route 18, East Brunswick, Drainage and Pavement Rehabilitation	10354	Road Preservation	50.00
Route 18, South of Texas Road to Rues Lane, Pavement	11408	Road Preservation	22.90
Route 27 ADA Ramps, Evergreen St to Elizabeth River	10316A	Bike/Ped	10.60
Route 33, Bentley Road to Manalapan Brook	12425	Road Preservation	9.24
Route 130, Westfield Ave. to Main Street	11309	Road Preservation	4.60
Route 171, Route 130 to Lincoln Avenue	15363	Road Preservation	2.54
** Schalk's Crossing Road Bridge, CR 683	00321	Bridges	13.46
Mid-Term			
Grove Avenue, Bridge over Port Reading RR	14423	Bridges	6.04
Route 1, Alexander Road to Mapleton Road	17419	Road Expansion	30.20
Route 1, NB Bridge over Raritan River	15303	Bridges	12.05
Route 9/35, Main Street Interchange	079A	Road Enhancement	37.50
Route 18 NB, Bridge over Conrail	16352	Bridges	8.28
Route 35, Heards Brook and Woodbridge Creek, Culvert Replacement	10381	Bridges	6.70
Route 35, Route 9 to Colonia Boulevard	15392	Road Preservation	10.57
Route 130, Bridge over Millstone River	16339	Bridges	6.80
Route 287, Interchange 10 Ramp Improvements	9169Q	Road Enhancement	10.60
Route 287, River Road (CR 622), Interchange Improvements	9169R	Road Enhancement	4.90
Projects Under Study			
Carteret Ferry Service Terminal	06316	Transit Expansion	
Carteret, International Trade and Logistics Center Roadway Improvements	06344	Freight	
Park Avenue Bridge	99313	Bridges	
Route 1, Forrestal Road to Aaron Road	08417	Road Expansion	
Route 26, Cox Road to Nassau Street	15398	Road Preservation	
Route 440, Route 95 to Kreil Avenue	14355	Road Preservation	
South Amboy Intermodal Center	98541	Road Enhancement	
Tremley Point Connector Road	9324A	Road Expansion	

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** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
NJ TRANSIT			
Near-Term			
Perth Amboy Intermodal ADA Improvements	T620	Transit Enhancement	22.21
Projects Under Study			
Central New Jersey Route 1 Bus Rapid Transit	TN10002	Transit Expansion	
Route 9 Bus Enhancements	TN12001	Transit Enhancement	
Authority Projects			
Near/Mid-Term			
New Jersey Turnpike Authority			
GSP Interchange 125	GSP1003	Road Enhancement	
NJ Turnpike Interchange 10 Improvement Project	TPK1403	Road Enhancement	

Monmouth

Highway/Bridges

Near-Term			
ADA Central, Contract 2	15418	Bike/Ped	14.20
Halls Mill Road	HP01002	Road Enhancement	18.00
** Monmouth County Bridges W7, W8, W9 over Glimmer Glass and Debbie's Creek	NS9306	Bridges	34.00
Route 18, South of Texas Road to Rues Lane, Pavement	11408	Road Preservation	22.90
Route 33, Bentley Road to Manalapan Brook	12425	Road Preservation	9.24
Route 33, School House Road to Fortunato Place	12405	Road Preservation	4.66
Route 33B, Kondrup Way to Fairfield Rd	12410	Road Preservation	5.20
Route 34, Bridge over former Freehold and Jamesburg Railroad	11315	Bridges	9.24
Route 35, Old Bridge Road to Route 34 & Route 70	15389A	Road Preservation	11.50
Route 66, Jumping Brook Road to Bowne Road/Wayside Road	14357	Road Preservation	18.30
Route 71, Wyckoff Road, CR 547	HP01001	Road Enhancement	4.50
Route 195 WB, Route 295 to CR 524/539 (Old York Road)	14377	Road Preservation	0.83
** Rumson Road over the Shrewsbury River, CR 520	NS9706	Bridges	64.00
Mid-Term			
ADA Central, Contract 1	15417	Bike/Ped	21.00
** County Route 537 Corridor, Section A, NJ Rt. 33 Business and Gravel Hill Road	NS0403	Road Enhancement	30.70
Route 33 Business, Bridge over Conrail Freehold Secondary Branch	12379	Bridges	12.50
Route 33, Bridge over Millstone River	14422	Bridges	5.85
Route 34, CR 537 to Washington Ave., Pavement	11307	Road Preservation	99.00

** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Route 35, Bridge over North Branch of Wreck Pond	14429	Bridges	3.75
Route 71, Bridge over NJ Transit (NJCL)	15449	Bridges	30.50
Projects Under Study			
Laurel Avenue NJ Transit Bridge Replacement	08379	Bridges	
Long Branch Ferry Terminal	06314	Transit Enhancement	
Monmouth County Bridge S-31 (AKA Bingham Avenue Bridge) over Navesink River, CR 8A	NS9603	Bridges	
Route 9, Bus Rapid Transit	07350	Road Enhancement	
Route 34, Route 35 & 70 to Route 195/138	15402	Road Preservation	
Route 36, Bridge over Troutman's Creek	16349	Bridges	
Route 36, Clifton Ave/James St to CR 520 (Rumson Rd)	15384	Road Preservation	
Route 66, West of Jumping Brook Road to East of Wayside Avenue	08329	Road Enhancement	
Route 70, Dakota Trail to Riverview Drive (CR 48)	15372	Road Preservation	
Route 71, Bridge over Shark River	16316	Bridges	
Route 138, Garden State Parkway to Route 35	15401	Road Preservation	
Route 79, Route 9 to Route 34 (Middlesex Street)	15380	Road Preservation	
School House Road, Bridge over Route 35	16312	Bridges	
NJ TRANSIT			
Projects Under Study			
Route 9 Bus Enhancements	TN12001	Transit Enhancement	
Authority Projects			
Near/Mid-Term			
New Jersey Turnpike Authority			
GSP Interchange 105	GSP1404	Road Enhancement	
GSP Interchange 109	GSP1405	Road Enhancement	
GSP Shoulder Restoration and Improvements Program, MP 83 to 100	GSP1401	Safety	

Morris

Highway/Bridges

Near-Term			
ADA North, Contract 1	15411	Bike/Ped	6.00
ADA North, Contract 2	15412	Bike/Ped	1.10
ADA North, Contract 4	15414	Bike/Ped	5.10
** Landing Road Bridge Over Morristown Line, CR 631	NS9708	Bridges	7.58
** NY Susquehanna and Western Rail Line Bicycle/Pedestrian Path	NS9803	Bike/Ped	12.00
** Openaki Road Bridge	NS9802	Bridges	7.50

** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Route 10, Hillside Ave (CR 619) to Mt. Pleasant Tpk (CR 665)	11339	Road Preservation	19.30
Route 10, WB Rt 287 to Jefferson Rd	12436	Road Preservation	3.51
Route 23, Alexander Road to Maple Lake Road	11424	Road Preservation	11.68
Route 46, Main Street/Woodstone Road (CR 644) to Route 287, ITS	06366A	ITS	5.90
Route 46, Route 287 to Route 23 (Pompton Avenue), ITS	06366B	ITS	5.90
Route 46, Stiger St to Sand Shore Rd/Naughright Road	15387	Road Preservation	4.60
Route 57/182/46, Hackettstown Mobility Improvements	9237	Road Enhancement	3.10
Route 80, Rockfall Mitigation, Rockaway, Denville, Par-Troy	15444	Safety	3.25
Route 15 and Berkshire Valley Road (CR 699)	13350	Road Enhancement	3.97
Route 181, Espanog Road to Prospect Point Road	15378	Road Preservation	1.60
Route 287 NB, Route 202/206 to South Street (CR 601)	15405	Road Preservation	17.05
* Schooleys Mountain Bridge Rehabilitation	N1707	Bridges	1.00
** Two Bridges Road Bridge and West Belt Extension	NS9801	Bridges	23.20
** Waterloo Road over Musconetcong River	NS0107	Bridges	3.00
Mid-Term			
Route 10, EB widening from Route 202 to Route 53	12303	Road Expansion	10.25
Route 10, Jefferson Road	00312	Road Enhancement	11.25
Route 10/202, NJ 53 to Johnson Road, Operational Improvements	98338C	Road Enhancement	22.30
Route 15 SB, Bridge over Rockaway River	14414	Bridges	9.71
Route 23, Bridge over Pequannock River / Hamburg Turnpike	08347	Bridges	54.60
Route 46, Canfield Avenue	13316	Road Enhancement	6.33
Route 46, Main Street/Woodstone Road (CR 644) to Route 80	06366D	Road Enhancement	10.50
Route 46, Pequannock Street to CR 513 (West Main Street)	16318	Safety	4.55
Route 53, Pondview Road to Hall Avenue	12424	Road Preservation	4.53
Route 80, Bridges over Howard Boulevard (CR 615)	15351	Bridges	34.35
Route 80, Route 15 Interchange	93139	Road Enhancement	63.50
Projects Under Study			
CR 510 (Columbia Turnpike), Bridge over Black Brook	N1604	Bridges	
Martin Luther King Avenue Bridge (No. 1400-118) over the Whippany River	N1804	Bridges	
Route 15 Corridor, Rockfall Mitigation	15441	Safety	
Route 24, EB Ramp to CR 510 (Columbia Turnpike)	15433	Road Enhancement	
Route 46, Route 80 Exit Ramp to Route 53	06366E	Road Enhancement	
Route 202, Childs Rd/N Maple Ave (CR 613) to Academy Road	15381	Road Preservation	
Scour Countermeasure Design and Installation	16333	Bridges	
NJ TRANSIT			
Near-Term			
Lackawanna Cutoff MOS Project	T535	Transit Expansion	21.89

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** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)

Ocean

Highway/Bridges

Near-Term

Route 9, Indian Head Road to Central Ave/Hurley Ave, Pavement	11418	Road Preservation	53.45
Route 9, Jones Rd to Longboat Ave	11330	Road Preservation	7.45
Route 37, EB Thomas St to Fisher Blvd	12404	Road Preservation	5.25
Route 70, East of North Branch Road to CR 539	10307	Road Preservation	11.56
Route 72, East Road	94071A	Road Enhancement	10.03
Route 72, Manahawkin Bay Bridges, Contract 1A & 1B	11385	Bridges	39.42
Route 72, Manahawkin Bay Bridges, Contract 4	00357C	Bridges	26.51
Route 37, Garden State Parkway/Route 9 to Route 166	15369	Road Preservation	4.10

Mid-Term

ADA Central, Contract 1	15417	Bike/Ped	21.00
F.R.E.C. Access Road, Bridge over Toms River	15323	Bridges	4.07
Route 35, Osborne Avenue to Manasquan River	15389	Road Preservation	22.30
Route 88, Bridge over Beaver Dam Creek	09322	Bridges	5.51
Route 166, Bridges over Branch of Toms River	14324	Bridges	10.10

Projects Under Study

Chadwick Beach Island Bridge (No. 1507-007) over Barnegat Bay	N1805	Bridges	
Garden State Parkway Interchange 83 Improvements	N1405	Road Enhancement	
Route 9, Bus Rapid Transit	07350	Road Enhancement	
Route 9, Lakewood/Toms River, Congestion Relief	076C	Road Expansion	
Route 9, Mizzen Avenue and Washington Avenue, Intersection Improvements	97080N	Road Enhancement	
Route 9, Washington Avenue to Beachwood Boulevard	15432	Road Enhancement	
Route 70, Dakota Trail to Riverview Drive (CR 48)	15372	Road Preservation	

NJ TRANSIT

Projects Under Study

Route 9 Bus Enhancements	TN12001	Transit Enhancement	

Authority Projects

Near/Mid-Term

New Jersey Turnpike Authority

GSP Interchange 91 Improvements (Burnt Tavern Road)	GSP098	Road Enhancement	
GSP Mainline Widening From Interchange 35 to 80	GSP1408	Road Expansion	
GSP Shoulder Restoration and Improvements Program, MP 83 to 100	GSP1401	Safety	

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)

Passaic

Highway/Bridges

Near-Term

** Fifth Avenue Bridge (AKA Fair Lawn Avenue Bridge) over Passaic River	NS9606	Bridges	17.50
** NY Susquehanna and Western Rail Line Bicycle/Pedestrian Path	NS9803	Bike/Ped	12.00
Route 19, Colfax Ave (CR 609) to Marshall Street	12419	Road Preservation	5.30
Route 20, Paterson Safety, Drainage and Resurfacing	08372	Road Preservation	24.00
Route 21, Dayton Street to Route 46 West	12400	Road Preservation	4.87
Route 23, Bloomfield Avenue to Bridge over NJ Transit, ADA Contract	12420A	Road Preservation	3.45
Route 46, Passaic Avenue to Willowbrook Mall	9233B3	Road Enhancement	37.20
Route 46, Route 23 (Pompton Avenue) to Route 20, ITS	06366C	ITS	5.90
Route 46, Route 287 to Route 23 (Pompton Avenue), ITS	06366B	ITS	5.90
Route 80 EB, Fairfield Road (CR 679) to Route 19	11341	Road Preservation	7.40
** Two Bridges Road Bridge and West Belt Extension	NS9801	Bridges	23.20

Mid-Term

Route 3, Route 46, Valley Road and Notch/Rifle Camp Road Interchange, Contract B	059B	Road Enhancement	135.65
Route 23, Bridge over Pequannock River / Hamburg Turnpike	08347	Bridges	54.60
Route 23, High Crest Drive to Macopin River	11424A	Road Preservation	9.93
Route 23, NB Bridge over Pequannock River	14440	Bridges	5.05
Route 23, Route 80 and Route 46 Interchange	9233B6	Road Enhancement	32.00
Route 80 WB, McBride Avenue (CR 639) to Polify Road (CR 55)	11415	Road Enhancement	339.80
Route 80, Bridge over Passaic River, Riverview Drive & Mc Bride Avenue	17316	Bridges	60.65
Taft Avenue, Pedestrian Bridge over Route 80	16308	Bridges	3.50

Projects Under Study

Main Avenue Corridor Improvements	N1806	Road Enhancement	
Route 23 Rockfall Mitigation, West Milford Township	16324	Safety	
Sixth Avenue (CR 652), Bridge over Passaic River	N1606	Bridges	

** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)

Somerset

Highway/Bridges

Near-Term

* North Plainfield Downtown Streetscape and Pedestrian ADA Central, Contract 2	15418	Bike/Ped	14.20
ADA Central, Contract 3	15419	Bike/Ped	10.48
Camp Meeting Avenue Bridge over Trenton Line, CR 602	99405	Bridges	8.45
** County Bridge K0607, New Brunswick Road over Al's Brook	N1407	Bridges	3.00
CR 514 (Amwell Road), Bridge over D&R Canal	14350	Bridges	4.36
Delaware & Raritan Canal Bridges	15322	Bridges	12.25
Route 22, EB, Route 78 to Rt 28 (CR 614, Easton Turnpike)	11409	Road Preservation	10.69
Route 202, First Avenue Intersection Improvements	02372B	Road Enhancement	5.58
Route 202/206, over Branch of Peter's Brook, Culvert Replacement at MP 27.96	11363	Bridges	4.70
Route 206 Bypass, Mountain View Road to Old Somerville Road (Sections 14A & 15A) Contract B	779	Road Expansion	57.00
Route 206, Doctors Way to Valley Road	780B	Road Expansion	40.50
Route 206, Southbound Merge Improvements with I-287 Ramp	02372A	Road Enhancement	2.24
Route 287 NB, Route 202/206 to South Street (CR 601)	15405	Road Preservation	17.05
Route 287/78, I-287/202/206 Interchange Improvements	04389	Safety	12.20

Mid-Term

Hamilton Road, Bridge over Conrail RR	14416	Bridges	8.46
Route 28, Rt 287 to Tea Street	13318	Safety	2.73
Route 202, Bridge over North Branch of Raritan River	14415	Bridges	2.40
Route 206, Valley Road to Brown Avenue	780A	Road Expansion	56.50
Route 287, Interchange 10 Ramp Improvements	9169Q	Road Enhancement	10.60

Projects Under Study

CR 512 (Valley Road), Bridge over Passaic River	N1607	Bridges	
North Plainfield Downtown Streetscape and Pedestrian Improvements (Final Phase)	N1125	Bike/Ped	
Picket Place, CR 567 Bridge (C0609) over South Branch of Raritan River	N1807	Bridges	
Route 22, Sustainable Corridor Long-term Improvements	03318	Road Enhancement	
Route 202, Childs Rd/N Maple Ave (CR 613) to Academy Road	15381	Road Preservation	
Route 202, Old York Road (CR 637) Intersection Improvements	12332	Road Enhancement	
Route 202/206 and Route 22 Interchange, North Thompson Street to Commons Way, Operational and Safety Improvements	02372	Road Enhancement	

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** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
NJ TRANSIT			
Projects Under Study			
West Trenton Line Initiative	TN05003	Transit Expansion	
Sussex			
Highway/Bridges			
Near-Term			
ADA North, Contract 2	15412	Bike/Ped	1.10
Route 15, Bridge over Paulins Kill	09319	Bridges	4.28
Route 23, Hardyston Township Improvements	96039	Safety	12.30
Route 94, Pleasant Valley Drive to Maple Grange Road	15391	Road Preservation	6.00
Route 206 Rockfall Mitigation, Andover Township	16326	Safety	4.65
Route 206, Pines Road to CR 521 (Montague River Road)	12398	Road Preservation	9.80
** Waterloo Road over Musconetcong River	NS0107	Bridges	3.00
Projects Under Study			
Route 15 Corridor, Rockfall Mitigation	15441	Safety	
Route 23 and Route 94 Rockfall Mitigation, Hardyston Township	16325	Safety	
Route 206, Bridge over Dry Brook	16337	Bridges	
Scour Countermeasure Design and Installation	16333	Bridges	
NJ TRANSIT			
Near-Term			
Lackawanna Cutoff MOS Project	T535	Transit Expansion	21.89
Authority Projects			
Near/Mid-Term			
Delaware River Joint Toll Bridge Commission			
Delaware Water Gap River Road Improvements	DB14038	Road Enhancement	
Delaware Water Gap Toll	DB14015	ITS	
DWG / I-80 NJ Roadway Safety Improvements	DB14024	Safety	
Porland–Columbia Approach Roadway Improvements	DB14036	Road Enhancement	
Portland–Columbia Ped. TSB Improvements	DB14031	Bridges	
Portland–Columbia Toll	DB14014	ITS	

** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)

Union

Highway/Bridges

Near-Term

** Gordon Street over "Out of Service" Conrail Branch, Replacement	NS0408	Bridges	8.50
* Kapkowski Road - North Avenue East Improvement Project	17339	Road Enhancement	13.63
Route 1&9, Interchange at Route I-278	95023	Road Enhancement	65.00
Route 22, Bloy Street to Liberty Avenue	658C	Bridges	8.65
Route 22, Bridge over Echo Lake	14330	Bridges	2.11
Route 22, Chestnut Street Bridge Replacement (CR 626)	04361	Bridges	22.40
Route 22, Hilldale Place/North Broad Street	658E	Bridges	11.31
Route 22, Westbound, Vicinity of Vaux Hall Road to West of Bloy Street	658B	Road Enhancement	4.80
Route 27 ADA Ramps, Evergreen St to Elizabeth River	10316A	Bike/Ped	10.60
Route 27, Dehart Place to Route 21	15371	Road Preservation	13.26
Route 28, Grove Street to Highland Avenue	12421	Road Preservation	12.11
Route 82, Caldwell Avenue to Lehigh Avenue	11404	Bike/Ped	20.58

Mid-Term

Route 22/Route 82/Garden State Parkway Interchange	658A	Road Preservation	21.95
Route 27 NB, Bridge over Former CNJRR (Abandoned)	16303	Bridges	7.36
Route 35, Route 9 to Colonia Boulevard	15392	Road Preservation	10.57
Route 82, Rahway River Bridge	94019	Bridges	8.20

Projects Under Study

New Providence Downtown Streetscape	09341	Transp. Enhancements	
Route 1&9, Avenue C to Sylvan Street	12311	Safety	
Route 439, Route 28 (Westfield Ave) to Route 27 (Newark Ave)	15395	Road Preservation	
South Front Street Bridge over the Elizabeth River	N1409	Bridges	
Tremley Point Connector Road	9324A	Road Expansion	

NJ TRANSIT

Near-Term

NEC Elizabeth Rail Station Improvements	T600	Transit Preservation	17.95

Projects Under Study

Union County Rapid Transit System	TN05007	Transit Expansion	

Authority Projects

Near/Mid-Term

Goethals Bridge Replacement	CB07-103	Road Expansion	

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** Projects are funded by DBNUM N063, NJTPA Future Projects.

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)

Warren

Highway/Bridges

Near-Term

ADA Central, Contract 3	15419	Bike/Ped	10.48
ADA North, Contract 1	15411	Bike/Ped	6.00
Route 22, Rockfall Mitigation, Phillipsburg	15442	Safety	2.25
Route 31, Bridge over Furnace Brook	09325	Bridges	5.55
Route 46, Stiger St to Sand Shore Rd/Naughright Road	15387	Road Preservation	4.60
Route 57, Bridge over Shabbacong Creek	15447	Bridges	4.45
Route 57, CR 519 Intersection Improvement	97062B	Road Enhancement	13.20
Route 57/182/46, Hackettstown Mobility Improvements	9237	Road Enhancement	3.10
Route 94, Bridge over Jacksonburg Creek	11322	Bridges	4.90
Route 173, Bridge over Pohatcong Creek	09320	Bridges	3.70

Mid-Term

Route 22, Bates Avenue to Route 57	11369	Road Preservation	5.80
Route 46, Bridge over Paulins Kill	16347	Bridges	12.18
Route 46, Route 80 to Walnut Road	11340A	Road Preservation	9.90
Route 57, Bridge over Branch Lopatcong Creek	16345	Bridges	1.25
Route 57, Lopatcong Creek, Culvert Replacement	11351	Bridges	3.27
Route 80, WB Rockfall Mitigation, Hardwick Township	09545	Safety	59.15

NJ TRANSIT

Near-Term

Lackawanna Cutoff MOS Project	T535	Transit Expansion	21.89

Authority Projects

Near/Mid-Term

Delaware River Joint Toll Bridge Commission

Delaware Water Gap Toll Bridge Improvements	DB12001	Road Expansion
Easton-Phillipsburg Toll	DB14013	ITS
I-78 Bridges & Approach Slabs Rehabilitation Project	DB14018	Bridges
I-78 Bridges and Approach Slabs Rehabilitation	DB14023	Bridges
I-78 New Jersey Roadway Mill & Paving	DB14022	Road Preservation
I-78 Open Road Tolling Lanes	DB14035	ITS
I-78 Toll Bridge Deck Overlay & Parapet Replacement	DB14021	Bridges
I-78 Toll Bridge PA Approach Paving Improvements	DB14002	Road Preservation
Interstate 78 Toll	DB14012	ITS
Northampton Street TSB Bridge Floor System Replacement & Rehabilitation	DB12011	Bridges
Riverton–Belvidere Water Street Improvements	DB14041	Road Enhancement

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)

Various

NJ TRANSIT

Near-Term

Bus Maintenance Facilities	T93	Transit Preservation	17.25
Delco Lead Safe Haven Storage and Re-inspection Facility Project	T907	Transit Preservation	30.27
Hoboken Ferry Service Improvements	T702	Transit Preservation	12.00
Hoboken Long Slip Flood Protection Project	T908	Transit Preservation	29.93
Hudson-Bergen LRT Northern Extension	T301	Transit Expansion	95.00
NJ TRANSIT Grid Project	T910	Transit Preservation	510.02
NJ TRANSIT Raritan River Drawbridge Replacement Project	T909	Transit Preservation	134.64
NJ TRANSIT System Repairs/Restoration	T906	Transit Preservation	140.44
Train Controls-Wayside Signals, Power & Communication Resiliency	T911	Transit Preservation	26.64
Wood Ridge Maintenance Of Way Facility Relocated Project	T38	Transit Preservation	10.00

Long-Term

Hudson Tunnel Project	TLM01	Transit Enhancement	11,100.00
North River Tunnel Rehab	TLM02	Transit Preservation	1,800.00
Portal Bridge North	T538	Transit Preservation	1,642.20

Authority Projects

Near/Mid-Term

Delaware River Joint Toll Bridge Commission

Phase 1 Delaware Water Gap Toll Bridge Open Road Tolling Implementation	DB14037	ITS

ONGOING PROGRAMS

Highway/Bridges

Acquisition of Right of Way	X12	Overhead	12.00
Active Traffic Management System (ATMS)	13303	ITS	26.00
ADA Curb Ramp Implementation	11344	Bike/Ped	84.00
ADA North, Contract 3	15413	Bike/Ped	2.45
Airport Improvement Program	08415	Aviation	108.00
Asbestos Surveys and Abatements	04311	Overhead	12.00
Betterments, Dams	01335	Road Preservation	2.72
Betterments, Roadway Preservation	X72B	Road Preservation	409.00
Betterments, Safety	X72C	Safety	272.00
Bicycle & Pedestrian Facilities/Accommodations	X185	Bike/Ped	164.00
Bridge Deck/Superstructure Replacement Program	03304	Bridges	3,430.10
Bridge Emergency Repair	98315	Bridges	1,491.00
Bridge Inspection	X07A	Bridges	889.75

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Bridge Maintenance and Repair, Movable Bridges	14404	Bridges	910.03
Bridge Maintenance Fender Replacement	17357	Bridges	244.00
Bridge Maintenance Scour Countermeasures	17358	Bridges	244.00
Bridge Management System	X70	Bridges	28.00
Bridge Preventive Maintenance	13323	Bridges	1,492.00
Bridge Replacement, Future Projects	08381	Bridges	3,693.12
Bridge Scour Countermeasures	98316	Bridges	12.00
Capital Contract Payment Audits	98319	Overhead	31.70
Congestion Relief, Intelligent Transportation System Improvements (Smart Move Program)	02379	ITS	56.00
Congestion Relief, Operational Improvements (Fast Move Program)	02378	Road Enhancement	28.00
Construction Inspection	X180	Overhead	307.50
Construction Program IT System (TRNS.PORT)	05304	Overhead	26.62
Crash Reduction Program	X242	Safety	136.00
Culvert Replacement Program	09316	Bridges	84.00
DBE Supportive Services Program	X142	Overhead	3.30
Design, Emerging Projects	X106	Overhead	328.00
Design, Geotechnical Engineering Tasks	05342	Overhead	3.00
Disadvantaged Business Enterprise	X197	Overhead	1.00
Drainage Rehabilitation & Improvements	X154D	Road Preservation	136.00
Drainage Rehabilitation and Maintenance, State	X154	Road Preservation	462.00
Electrical Facilities	X241	Overhead	191.00
Electrical Load Center Replacement, Statewide	04324	Safety	108.00
Emergency Management and Transportation Security Support	17360	Overhead	40.00
Environmental Investigations	X75	Environment/Air Quality	136.00
Environmental Project Support	03309	Environment/Air Quality	19.60
Equipment (Vehicles, Construction, Safety)	X15	Overhead	677.00
Equipment, Snow and Ice Removal	X15A	Overhead	216.00
Ferry Program	00377	Transit Enhancement	108.00
Highway Safety Improvement Program Planning	09388	Safety	108.00
Intelligent Traffic Signal Systems	15343	ITS	660.00
Intelligent Transportation System Resource Center	13304	ITS	88.00
Intersection Improvement Program (Project Implementation)	98333	Safety	136.50
Interstate Service Facilities	X151	Road Enhancement	28.00
Job Order Contracting Infrastructure Repairs, Statewide	13305	Bridges	392.78
Legal Costs for Right of Way Condemnation	X137	Overhead	43.00
Local Aid Consultant Services	10347	Other	33.00
Local Aid Grant Management System	06327	Other	1.60
Local Aid, Infrastructure Fund	X186	Other	777.70
Local Bridges, Future Needs	08387	Bridges	1,218.10
Local CMAQ Initiatives	X065	TDM	247.00
Local Concept Development Support	06326	Other	95.25
Local County Aid, NJTPA	X41B1	Other	3,286.62
Local Freight Impact Fund	17390	Freight	777.70

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Local Municipal Aid, NJTPA	X98B1	Other	3,364.79
Local Municipal Aid, Urban Aid	X98Z	Other	272.00
Local Preliminary Engineering	N1202	Other	64.40
Local Safety/ High Risk Rural Roads Program	04314	Safety	560.00
Maintenance & Fleet Management System	X196	Road Preservation	56.00
Maritime Transportation System	01309	Freight	245.00
Metropolitan Planning	X30A	Other	672.44
Minor Bridge Inspection Program	17341	Bridges	186.60
Minority and Women Workforce Training Set Aside	07332	Overhead	28.00
Mobility and Systems Engineering Program	13306	ITS	432.00
Motor Vehicle Crash Record Processing	X233	Safety	67.50
National Highway Freight Program	X34A	Freight	1,172.39
New Jersey Rail Freight Assistance Program	X34	Freight	829.04
New Jersey Scenic Byways Program	X200C	Environment/Air Quality	12.00
NJTPA, Future Projects	N063	Other	2,972.30
Orphan Bridge Reconstruction	99372	Bridges	157.31
Park and Ride/Transportation Demand Management Program	X28B	TDM	28.00
Pavement Preservation	X51	Road Preservation	408.00
Pedestrian Safety Improvement Program	06401	Bike/Ped	107.00
Physical Plant	X29	Overhead	460.00
Planning and Research, Federal-Aid	X30	Overhead	990.00
Planning and Research, State	X140	Overhead	28.00
Pre-Apprenticeship Training Program for Minorities and Women	X135	Overhead	12.00
Program Implementation Costs, NJDOT	X10	Overhead	3,213.88
Project Development: Concept Development and Preliminary Engineering	10344	Overhead	32.00
Project Management & Reporting System (PMRS)	05341	Overhead	4.05
Project Management Improvement Initiative Support	17337	Overhead	1.34
Rail-Highway Grade Crossing Program, Federal	X35A1	Safety	315.50
Rail-Highway Grade Crossing Program, State	X35A	Safety	166.00
Recreational Trails Program	99409	Bike/Ped	27.00
Regional Action Program	X144	Road Enhancement	56.00
Restriping Program & Line Reflectivity Management System	X03A	Safety	460.00
Resurfacing Program	X03E	Road Preservation	3,244.00
Resurfacing, Federal	99327A	Road Preservation	7,588.00
Right of Way Database/Document Management System	05339	Overhead	2.20
Right of Way Full-Service Consultant Term Agreements	05340	Overhead	1.50
Rockfall Mitigation	X152	Safety	134.00
Safe Routes to School Program	99358	Safety	151.87
Safe Streets to Transit Program	06402	Bike/Ped	28.00
Salt Storage Facilities - Statewide	13307	Overhead	6.50
Segment Improvement Program	15807	Safety	56.00
Sign Structure Inspection Program	X239	Road Preservation	62.50
Sign Structure Rehabilitation/Replacement Program	X239A	Road Preservation	136.00

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Sign Structure Replacement Contract 2016-3	15335	Bridges	10.60
Signs Program, Statewide	X39	ITS	140.00
Solid and Hazardous Waste Cleanup, Reduction and Disposal	X160	Overhead	33.30
State Police Enforcement and Safety Services	X150	Safety	136.00
Statewide Traffic Operations and Support Program	13308	ITS	491.00
Storm Water Asset Management	17353	Road Preservation	121.16
Title VI and Nondiscrimination Supporting Activities	14300	Overhead	1.75
Traffic Monitoring Systems	X66	ITS	394.30
Traffic Signal Replacement	X47	ITS	245.00
Training and Employee Development	X244	Overhead	25.00
Transit Village Program	01316	Economic Development	28.00
Transportation Alternatives Program	X107	Transp. Enhancements	432.18
Transportation Demand Management Program Support	X43	TDM	2.50
Transportation Management Associations	11383	TDM	139.55
Transportation Research Technology	X126	Overhead	52.08
Unanticipated Design, Right of Way and Construction Expenses, State	X11	Overhead	2,510.07
Utility Pole Mitigation	15344	Overhead	1.75
Utility Reconnaissance and Relocation	X182	Overhead	136.00
Youth Employment and TRAC Programs	X199	Overhead	3.50

NJ TRANSIT

ADA--Platforms/Stations	T143	Transit Enhancement	24.94
Bridge and Tunnel Rehabilitation	T05	Transit Preservation	838.07
Bus Acquisition Program	T111	Transit Preservation	3,338.84
Bus Passenger Facilities/Park and Ride	T06	Transit Enhancement	23.60
Bus Support Facilities and Equipment	T08	Transit Preservation	599.95
Bus Vehicle and Facility Maintenance/Capital Maintenance	T09	Transit Preservation	809.54
Capital Program Implementation	T68	Overhead	494.29
Casino Revenue Fund	T515	TDM	404.66
Claims support	T13	Transit Enhancement	23.25
Environmental Compliance	T16	Transit Preservation	69.57
High Speed Track Program	T43	Transit Enhancement	72.72
Hudson-Bergen and Newark LRT System	T87	Transit Expansion	237.05
Immediate Action Program	T20	Transit Preservation	589.29
Job Access and Reverse Commute Program	T199	Transit Expansion	123.10
Light Rail Infrastructure Improvements	T95	Transit Preservation	336.40
Locomotive Overhaul	T53E	Transit Preservation	172.12
Miscellaneous	T122	Transit Enhancement	20.72
NEC Improvements	T44	Transit Preservation	4,261.63
Other Rail Station/Terminal Improvements	T55	Transit Enhancement	92.09
Physical Plant	T121	Transit Preservation	37.90
Preventive Maintenance-Bus	T135	Transit Preservation	3,874.89

Project Name	DBNUM	RCIS Category	YOE Estimate (in $ millions)
Preventive Maintenance-Rail	T39	Transit Preservation	8,548.29
Private Carrier Equipment Program	T106	Transit Preservation	68.00
Rail Capital Maintenance	T34	Transit Preservation	1,909.34
Rail Fleet Overhaul	T53G	Transit Preservation	43.50
Rail Rolling Stock Procurement	T112	Transit Preservation	7,103.52
Rail Support Facilities and Equipment	T37	Transit Preservation	243.50
Safety Improvement Program	T509	Transit Expansion	77.80
Section 5310 Program	T150	Transit Enhancement	199.48
Section 5311 Program	T151	Transit Enhancement	141.40
Security Improvements	T508	Security	60.27
Signals and Communications/Electric Traction Systems	T50	Transit Preservation	481.11
Small/Special Services Program	T120	Transit Enhancement	192.61
Study and Development	T88	Overhead	132.16
Technology Improvements	T500	Transit Enhancement	291.05
Track Program	T42	Transit Preservation	549.22
Transit Enhancements/Transp Altern Prog (TAP)/Altern Transit Improv (ATI)	T210	Transit Enhancement	903.28
Transit Rail Initiatives	T300	Transit Expansion	350.71
Programs Under Study			
Bus Rapid Transit Planning and Development	TN08004	Transit Expansion	
County Human Services Transportation (CHST) Coordination Projects Development—Interactive Provider Database and Management Information System	TN08006	Transit Expansion	
Greater Newark Area Bus System Study	TN08001	Transit Enhancement	
Market Research and Forecasting	TN05009	Transit Enhancement	
New Start/Concept Development	TN05011	Transit Expansion	
Station and Parking Planning	TN05008	Transit Enhancement	
System-wide Transit Capacity and Infrastructure Planning	TN05010	Transit Expansion	
Transit Friendly Planning, Land Use & Development Program	TN08005	Transit Enhancement	

The Regional Capital Investment Strategy for the NJTPA Region

THE FOLLOWING IS THE NJTPA'S Regional Capital Investment Strategy (RCIS). This strategy, which informs the project selection and policy direction of Plan 2045, was initially developed for NJTPA's 2030 Regional Transportation Plan, approved in September 2005. This RCIS has been carried forward into Plan 2045 with modified language, as discussed in Chapter 4. The changes are highlighted below in italics.

Investment Principles and Guidelines

Help Northern New Jersey Grow Wisely **Transportation investments should encourage economic growth while protecting the environment and minimizing sprawl in accordance with the *State Development and Redevelopment Plan, Energy Master Plan, and Greenhouse Gas Plan.***

Investment Guidelines

- *Encourage shorter and fewer motor vehicle trips, especially those involving single-occupancy vehicles, through continued support (about 2 percent of transportation funds) for demand management, including the programs of Transportation Management Associations.*
- Make investments that *support* development in cities, planned growth areas, distressed areas, centers, redevelopment areas, brownfield and grayfield sites, and other places with existing infrastructure.
- Scrutinize investments outside *the above* areas, to ensure that alternatives are examined, that they are justified by economic and community needs, and that sprawl-inducing impacts are minimized.
- Fund investments that encourage compact, mixed-used development, that support transit use ("transit oriented development"), *safe* walking/biking, *access to open space and recreation*, and cost-effective use of existing or planned public infrastructure.
- Use investments to help communities implement the North Jersey Regional Comprehensive Economic Development Strategy (CEDS), with special attention to facilitating access to jobs for all residents and communities.
- Protect the character of communities and the natural environment through context-sensitive design, traffic calming, historical preservation, roadway beautification *and creative placemaking strategies*.
- Develop transportation improvements that distribute benefits and burdens equitably and serve all communities, including low-income residents, minority populations, senior citizens, the disabled, *and* children.

Make Travel Safer **Improving safety and security should be explicitly incorporated in the planning, design and implementation of all investments.**

Investment Guidelines

- *Allocate approximately 4* percent of overall spending to *direct safety improvements*, while also fully incorporating safety enhancements in other investments.
- Enhance safety in areas with high fatality and injury rates, with particular attention to pedestrian travel and safety for seniors.
- *Target investments to address priority crash types identified in the New Jersey Strategic Highway Safety Plan.*
- *Use NJ TRANSIT Safety Programs to improve safety.*
- Develop improved safety measures at at-grade rail crossings along heavily traveled corridors *and other measures to address freight movement safety.*
- Consider national security and disaster response issues in facility designs.

Fix it First **The existing transportation system requires large expenditures for maintenance, preservation, and repair, and its stewardship should be the region's highest priority.**

Investment Guidelines

- *Invest 73 percent of overall spending in* maintenance and preservation, with about *36* percent going to transit, 20 percent to bridges, and *17* percent to roads.
- Maintain, preserve, rehabilitate, and replace infrastructure applying *asset management techniques to address* objective measures such as facility condition, level of use and projected service life ("life cycle").
- *Coordinate preservation investments with those that enhance the resiliency of the regional transportation network.*
- *Utilize innovative preservation materials and techniques to improve environmental conditions or at least to minimize negative environmental impacts.*
- *Streamline project delivery to make more cost effective use of available funding.*

Expand Public Transit **Investment to improve the region's extensive transit network should be a high priority, including strategic expansions to increase capacity and serve new markets.**

Investment Guidelines

- *Allocate about 8 percent of total spending* to enhancing and expanding public transportation (*about 4* percent dedicated to enhancing the public transit system—projects such as station and operational improvements—and *4* percent for expansion—new bus routes, new or extended rail lines, etc.)[1]
- Focus enhancements on improving the speed and reliability of trips, facilitating access to the system, incorporating pedestrian and bicycle facilities, integrating bus and rail services, and achieving new intermodal connectivity.
- Expand system *capacity* in measured steps based on the ability to attract new riders and achieve cost-effective operations.
- *Improve conditions and service at transit hub locations.*
- Build a new passenger rail tunnel under the Hudson River *and associated new capacity for expanded service*, which is the region's top transit expansion priority, by obtaining additional dedicated funding (beyond normal allocations that are subject to this regional capital investment strategy).

Improve Roads but Add Few **Road investments should focus on making the existing system work better, and road expansion should be very limited without compromising the tremendous accessibility provided by the existing highway system.**

Investment Guidelines

- The investment mix should *allot about 3 percent of spending* to physically *enhance* roadways (such as renovating intersections or adding turning lanes).[2]
- Limit expanding roadway capacity (new roads or widening) to about *1* percent of funding.
- Use t*he NJTPA congestion management process and context-sensitive criteria* to target roadway investments *that improve travel time reliability* and *address* bottlenecks *and hotspots. Emphasize improvements that will help to expedite efficient goods movement flows.*

1 Maintenance, technological and safety/security improvements are addressed in other guidelines. Does not include additional dedicated transit funding, such as for trans-Hudson transit expansion.

2 Particular road improvements, including technological, direct safety improvements, and creating dedicated freight facilities are addressed separately.

- Make improvements that strengthen parallel routes and network redundancy.
- *Invest in new and retrofitted facilities that enable safe access and mobility of pedestrians, bicyclists, and transit users of all ages and abilities.*
- Complement road improvements with transit, ridesharing, and pedestrian/bicycle projects to help limit auto trips.
- Avoid roadway expansion in environmentally sensitive areas or away from planned growth areas.
- *Utilize environmentally beneficial materials and design in road enhancement and expansion projects.*

Move Freight More Efficiently **Investments should be made to improve the efficiency of goods movement because of its importance to the region's economy and quality of life.**

Investment Guidelines

- *Allocate about 3 percent* of spending to dedicated freight improvements (such as freight rail facilities and intermodal infrastructure).
- *Support the transport of goods with improvements in the operations, efficiency, and connectivity of roadway, freight rail, and waterborne facilities. Give priority to the region's major corridors, including critical urban and rural truck corridors as well as first and last mile connectors.*
- Focus transportation investments on encouraging freight related redevelopment of brownfield sites and similar strategies particularly in and around *intermodal facilities and corridors.*
- Make investments that promote intermodal options *and optimization* where possible, including rail and waterborne freight movement via barges or ferries.
- *Address impediments to national freight rail standard access.*

Manage Incidents and Apply Transportation Technology **Investments should be made to transportation systems management and operations to improve information flow, operational coordination, energy use, and other technological advances that can make the transportation system work smarter and more efficiently.**

Investment Guidelines

- *About 4 percent of funding should be* dedicated to *direct* incident/emergency management projects, intelligent transportation systems, *and new technology, while incorporating such elements in other types of projects as well.*
- *Invest in cooperative planning and coordination among agencies to improve incident/emergency management and deployment of intelligent transportation systems.*
- *Invest in technological improvements in accordance with the region's Intelligent Transportation System (ITS) architecture.*
- Fund development of systems that provide real-time *traffic, transit, parking*, scheduling, and connection information on travel conditions to public transit customers, roadway travelers, and freight movers.
- *Provide for technology that serves first- and last-mile access to the public transit network.*
- Invest in information systems that support information flow within and among operating agencies including those responsible for addressing roadway incidents.
- Invest in improved and standardized electronic fare and toll payment systems.
- Focus initial ITS investments on demonstration projects to evaluate potentially beneficial new technologies and systems.
- *Invest in technologies that deliver environmental benefits, improve reliability, manage congestion, and streamline traffic flow.*

- *Support technology investments that are accessible/available to all travelers, regardless of income, age, disability, etc.*
- *Add cost-effective new technology infrastructure with demonstrable demand and benefits, such as that serving connected vehicles, autonomous and driverless vehicles, and on-demand transportation.*
- *Assess unwanted impacts from technology (e.g., self-driving cars that circle endlessly or reduced public transit demand), and adopt appropriate policies to minimize these impacts.*

Support Walking and Bicycling **All transportation projects should promote walking and bicycling wherever possible.**

Investment Guidelines

- *About 2 percent of funding should be applied to build and redesign facilities for walking and biking.*
- Enhance or create pedestrian and bicycle facilities, including sidewalks, bike lanes, and bike paths, which improve their connectivity for walking and biking trips and also complement other transportation improvements.
- Coordinate roadway and transit projects with pedestrian and bicycle improvements made by counties and municipalities.
- Target improvements to areas with existing, growing, or strong potential for walking and bicycle travel.
- Invest in improvements that support walking by children (such as Safe Routes to School) and others with limited motor vehicle travel options.
- *Invest in innovative projects such as Complete Streets and bike-share programs that support increased and safer walking and bicycling.*
- *Make use of environmentally beneficial materials and design for pedestrian and bicycle facilities.*

Increase Regional Resiliency ***Investments should be made to mitigate risks associated with climate change, extreme weather, homeland security, and other threats. Investments should consider criticality of infrastructure, vulnerability, and level of risk.***

Investment Guidelines

- *Prioritize transportation investments that offer additional benefits for resiliency, for system preservation projects as well as upgrades and expansions.*
- *Incorporate vulnerability and risk assessments into project development.*
- *Scrutinize investments that are in places highly vulnerable to potential flooding/sea level rise.*
- *Invest in alternate fuel infrastructure in support of energy independence.*
- *In concert with Enhance Roads and Expand Transit guidelines, coordinate investments within and across modes to strengthen parallel routes, enhance regional connectivity, increase the availability of mode options, and increase network redundancy.*
- *Make investments that support the targets of the Global Warming Response Act of 2007, addressing New Jersey's greenhouse gas reduction goals and related NJ State Plan recommendations. Coordinate such investments at state, regional, and local levels.*

Together North Jersey Focus Areas

FA1 Create and retain well-paying jobs by supporting growth in our region's key industries

1.1 Develop and implement a pilot program that makes it easier for businesses to obtain the permits they need to locate and expand in the region.
1.2 Explore creating an organization to help coordinate economic development activities region-wide.
1.3 Provide a forum for highlighting the economic and workforce development needs of our key industries.
1.4 Consider creating a North Jersey "Futures Council."
1.5 Connect small businesses that support the region's innovation clusters to growth and development opportunity.

FA2 Enhance North Jersey's innovation and entrepreneurship ecosystem

2.1 Expand the technical assistance and networking resources available to the region's startups and second-stage companies.
2.2 Establish a regional system of virtual incubators.
2.3 Foster other types of shared workspaces and connect them to economic development and finance programs.
2.4 Create and capitalize a regional innovation fund.

FA3 Strengthen the region's economy by building on existing assets and infrastructure

3.1 Use our region's transportation infrastructure as a framework for future investment.
3.2 Leverage the region's role as a major freight distribution hub.
3.3 Strengthen tourism by promoting North Jersey's arts, cultural, recreation, historic and natural amenities at the regional scale.
3.4 Support and expand agricultural businesses, urban farming and agritourism.

FA4 Align workforce training with industry needs

4.1 Align workforce development efforts with industry needs through improved data collection and enhanced coordination.
4.2 Expand occupational and soft skills training to address barriers to employment for disadvantaged workers.
4.3 Help incumbent workers transition to living-wage occupations.
4.4 Create regional apprenticeship and internship programs for non-college-bound students.
4.5 Promote skilled trades and other traditional vocational and technical programs.
4.6 Promote workforce development strategies to support the state's tourism industry.

FA5 Locate most new housing and commercial development in places with existing and planned infrastructure

5.1 Promote transit-oriented development (TOD).
5.2 Encourage infill and redevelopment on existing vacant and underutilized properties.
5.3 Prioritize brownfields for redevelopment.
5.4 Expand the use of innovative planning tools that promote smart development.

FA6 Create vibrant places and neighborhoods that will attract and retain residents, workers and visitors

6.1 Design places that meet the diverse needs of people in all age groups.
6.2 Create a physical vision for new development based on an understanding of the unique characteristics that define each place, including historic context.
6.3 Establish programming and management practices to create active, actively-managed spaces.
6.4 Locate development in areas that are walkable, bikeable, and accessible by public transit.
6.5 Invest strategically in catalyst spaces, rather than stand-alone building projects.
6.6 Create the local organizational framework to implement and manage these strategies.

FA7 Connect people and places with safe, convenient and reliable transportation

7.1 Maintain transportation infrastructure in a state of good repair.
7.2 Adopt and implement "Complete Streets" policies.
7.3 Improve conditions and service at "Transit Hub" locations.
7.4 Enhance and improve existing public and private transit services.
7.5 Increase transit system capacity in strategic locations.
7.6 Use New Jersey's State Highway Safety Plan and NJ TRANSIT Safety Programs to improve safety.
7.7 Use technology to improve transportation operations.

Find detailed Action Plans at:

togethernorthjersey.com/actionplans

FA8A Expand and diversify the region's housing supply to meet current and future demand

8A.1 Increase housing variety and choice by removing regulatory and other barriers to housing production.

8A.2 Target financial and other incentives to increase production of housing options not well-supplied.

8A.3 Increase the supply of housing affordable to a range of household sizes and incomes, especially in areas that are well-served by public transit.

8A.4 Ensure that the region's existing supply of deed-restricted affordable housing units remain affordable.

FA8B Address barriers to housing mobility, increase access to areas of high opportunity and affirmatively further fair housing policies region-wide

8B.1 Affirmatively further fair housing policies region-wide.

8B.2 Promote regional housing mobility by fostering innovation in the use of Housing Choice Vouchers.

8B.3 Use public investment programs to create, connect, and strengthen access to opportunity.

8B.4 Increase the supply of affordable, accessible housing options for people with disabilities and seniors in appropriate locations.

FA9 Create a system of public education that prepares all students for the 21st century economy

9.1 Address school funding disparities.

9.2 Expand school programming for the 21st Century.

9.3 Improve access for pre-K and early childhood education.

9.4 Improve educational outcomes by implementing "Community Schools," wraparound services, and school-community partnerships.

9.5 Expand boundaries and access to high performing schools.

FA10 Enhance the resiliency of the region's communities and infrastructure

10.1 Identify the region's vulnerabilities to extreme weather and climate change.

10.2 Adapt communities to be resilient to extreme weather events and the impacts of climate change.

10.3 Expand floodplain buyout programs and return flood-prone areas to their natural function.

10.4 Use green infrastructure to mitigate the impacts of extreme weather and climate change.

FA11 Transition to a clean energy economy

11.1 Reduce energy use through conservation and increased efficiency.

11.2 Transition to carbon-free electricity generation, including increased use of renewables.

11.3 Modernize and upgrade the region's power infrastructure.

11.4 Reduce petroleum use in the transportation sector.

FA12 Improve health outcomes for our region's residents

12.1 Integrate public health considerations in all aspects of planning and policy-making.

12.2 Increase access to affordable healthy foods and maximize access to locally produced fresh food.

12.3 Increase access to quality healthcare facilities, especially for medically underserved communities.

12.4 Enhance health education programs.

12.5 Create safe and healthy buildings, neighborhoods and communities through planning and design.

12.6 Expand the use of Crime Prevention Through Environmental Design (CPTED) strategies.

12.7 Improve conditions for communities that are disproportionately burdened by air pollution.

FA13 Improve stewardship of natural lands, agricultural lands, open space, parks, historic resources

13.1 Work with landowners to stewardship of privately owned natural lands and green space.

13.2 Expand programs to preserve parks, open space, natural and agricultural lands permanently.

13.3 Improve stewardship of public parks, open space and natural lands.

13.4 Implement best practices for stewardship of private and preserved agricultural lands.

13.5 Expand programs to preserve historic resources.

13.6 Improve stewardship of publicly-owned historic sites.

FA14 Manage water systems to improve water quality and supply

14.1 Improve management of stormwater runoff.

14.2 Protect water supplies through planning and enforcement.

14.3 Reduce or eliminate combined sewer overflows.

FA15 Revitalize and strengthen communities by expanding arts and cultural opportunities

15.1 Develop financing tools for arts and culture.

15.2 Support cultural programs and activities.

15.3 Integrate arts and culture into the local, county, regional, and statewide planning efforts.

15.4 Fund arts education for all New Jersey students.

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